

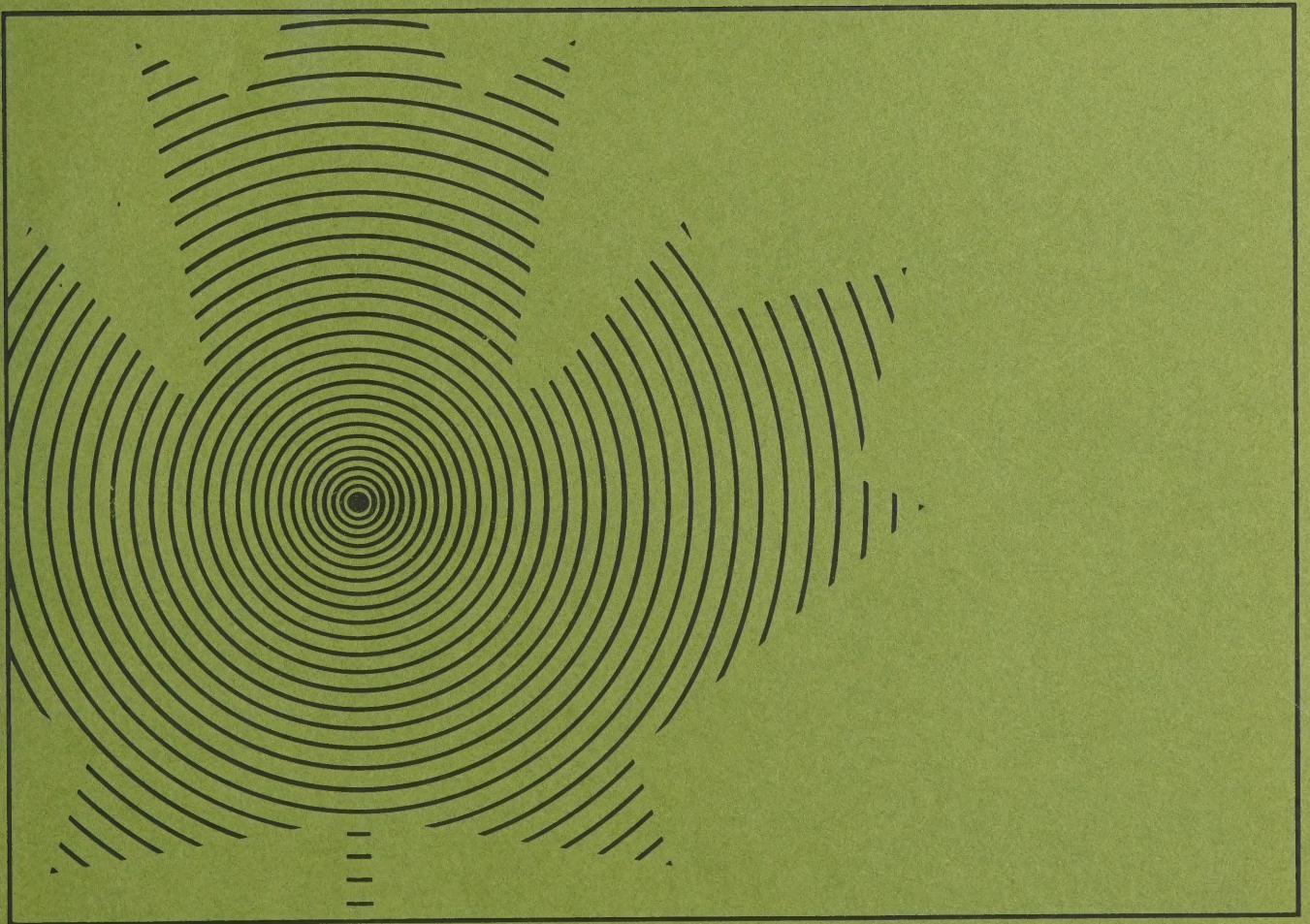
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Discussion
paper

Interim population projections of 22 Census Metro-
politan Areas (1971-2001)

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Ministry of State for Urban Affairs



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In order to estimate the future Canadian population, five projection series were formulated. Their basic differences are seen in the fertility and the net international migration assumptions. In all of the five projections, mortality was kept constant at the 1971 level and the net internal migration at the annual average of the 1966-1971 level. Regarding fertility, we hypothesized a total fertility rate ranging from a high of 2.4 to a low of 1.6, average number of children per female aged 15 to 49. For the net international migration, the projection series range from a high of 200,000 net international migrants to a low of 50,000 yearly net migrants. For illustrative rather than predictive purposes, the moderate projection, Series 3, which hypothesizes a total fertility rate of 2.2 children per female and a net international migration of 100,000 yearly migrants, was chosen as most representative.

By the turn of the twenty first century, at least 15 million Canadian may reside in the present Census Metropolitan Areas; but the actual total may reach as high as 21 million, if the range of assumptions embodied in these projections is reasonable.

This range implies that as a whole the metropolitan areas will grow at a rough annual average rate of somewhere between 1.2 and 2.4 percent from 1971 to 1981. Under either of these two growth rates, the 1971 population of 22 Census Metropolitan Areas would almost double as a minimum in the 40 years from 1961 to 2001.

The projections imply that the five fastest growing CMA's will be located in the western half of Canada. They are Calgary, Edmonton, Sudbury, Vancouver and Victoria. Calgary is projected to at least double its population between 1971 and 2001 under all five series. Vancouver is projected to double its population under three of the five series while Edmonton,

Sudbury and Victoria will double their populations under two of the five series. The group also includes Kitchener-Waterloo, London, Toronto, Quebec, Windsor and Hamilton. The slowest growing CMA's according to the projections, are generally among the smaller ones, and are located from the Prairies to the Atlantic Region. Generally these areas are projected as showing a growth of the rough order of 10 percent between 1971 and 2001. These areas include Chicoutimi-Jonquière, Regina, Saint John (N.B.) and Thunder Bay.

It is expected that the percentage of Canada's population residing in the 22 CMA's will increase only slightly, from 55 to 57 percent, over the 30 years from 1971 to 2001. Among the five major regions of Canada, only the Prairies and Quebec show really marked increases in the proportion of the total population that resides in CMA's. In Ontario the corresponding percentage is projected as falling, while in British Columbia it falls from 1971 to 1981 but then rises again by 2001 to the 1971 level. In the Atlantic region, the percentage remains quite stable at somewhat above 20 percent. In short, according to series 3 and roughly comparable Statistics Canada assumptions, massive increases in the proportion of the national population residing within Census Metropolitan Areas are not envisaged up to the year 2001.

The territorial distribution of the urban pattern confirms past trends. The trend illustrates the displacement of the urban centre of gravity from the eastern coast to our national western boundary. In fact, between the years 1971 and 2001, the relative share of the population in the British Columbia and Prairie Regions is expected to increase while the Quebec and Atlantic Regions' proportion of the national population is projected to decline. Ontario's relative share of Canadian residents is expected to remain quasi stable during the projected period.

Much of the importance of population growth derives from its ramifications upon several aspects of the Canadian economy and society. In this section a few of the areas of ramification will be mentioned in connection with the projections.

The "baby boom" generation, is, the cohort born between the years of 1945 to 1960 and who, today, are between the ages of 15 and 25, are already having an impact upon the labour force and the housing market, etc. This impact is expected to last into the second half of eighties. We must also add that changing values and societal norms, within both the world of work and the home mean that more women may join the labour market in terms of Gross National Product inputs.

Another important issue is the relationship between the modifications in the age distribution of the population and housing needs. Projected increases for households by persons aged 35 to 44 for the years 1971 to 1981 are expected to be in the vicinity of 25 percent. The smallest projected increase for households, approximately 10 percent, is expected to be for the 45 to 54 age group. Household increases for the two oldest age groups, those 55 to 64 and those aged 65 and over, are projected to range between 25 and 35 percent. Via household estimates, particularly for the years 1971 to 1981, when the youngest post-war babies will reach the age of 21 (1981), severe pressures may be expected on the demand for housing. For example, over that same period of time, households in the largest metropolitan areas (over one million in population) are expected to increase by 85 percent.

Land needed for housing development must also be considered. These needs will largely depend on the density of the population in a given territory. If we keep the spatial density of households constant,

rapid urban sprawling may become inevitable.

Dealing with the difficulties of trying to minimize traffic congestion and to maximize accessibility within a given area, medium size cities with rapid population growth are the areas expected to be mostly affected. The growth of the metropolitan areas will also accentuate such environmental problems as the progressive absorption of prime agricultural land for urban uses and air pollution.

Résumé

Afin d'estimer la croissance future de la population canadienne, nous avons formulé 5 scénarios possibles basés sur différentes hypothèses de fécondité et de migration internationale nette. Seule la mortalité et la migration interne nette ont été gardées constantes, la première au niveau de 1971 et la seconde au taux moyen observé durant la période 1966-1971. Même si les différences de fécondité expliquent les écarts entre les diverses projections, les migrations demeurent toutefois le moteur de la croissance démographique des prochaines décennies.

En ce qui concerne les niveaux de fécondité futurs les plus probables, nous avons supposé un indice synthétique de fécondité se situant entre un minimum de 1.6 et un maximum de 2.4. Ces chiffres représentent le nombre moyen d'enfants qu'aurait une femme âgée entre 15 et 49 ans appartenant à une cohorte fictive non soumise à la mortalité et soumise aux conditions de fécondité de l'année 1971. Au regard de la migration internationale nette, celle-ci évoluera annuellement entre une limite supérieure de 200,000 et une limite inférieure de 50,000. Nous proposons l'hypothèse moyenne No. 3 où l'indice synthétique de fécondité s'élève à 2.2 et la migration internationale à 100,000, comme la plus représentative de l'évolution future de la population dans les R.M.R.

En supposant que l'un ou l'autre des cinq scénarios soit possible, la population canadienne habitant dans les régions métropolitaines de recensement en 2001 se situera entre 21 (hypothèse forte) et 15 (hypothèse faible) millions. Cet écart présuppose à court terme (entre 1971 et 1981), une croissance annuelle moyenne de la population des grandes zones métropolitaines se situant entre 1.2 et 2.4%. Quelque soit le rythme de croissance retenu, la population totale des 22 régions métropolitaines selon la définition de 1971 sera, à l'aube du siècle prochain, au minimum le double de

celle de 1961.

Selon nos projections, les cinq régions métropolitaines qui connaîtront la plus grande croissance se situent dans l'ouest du pays. Il s'agit de Calgary, Edmonton, Sudbury, Vancouver et Victoria. Calgary doublera au moins sa population entre 71 et 2001 sous chacune des 5 projections, Vancouver sous trois projections et Edmonton, Sudbury et Victoria sous seulement deux des 5 scénarios possibles. L'Ontario et le Québec renferment la majeure partie des R.M.R. pour lesquelles nous avons prévu une croissance minimale de 50% durant la période. A la tête du groupe, on retrouve Ottawa-Hull avec une croissance qui se situe aux environs de 100% sous chacun des 5 scénarios. Le groupe renferme aussi Kitchener-Waterloo, London, Toronto, Québec, Windsor et Hamilton. Les R.M.R. les moins peuplées qui se situent des Maritimes aux Prairies sont aussi celles qui augmenteront le moins rapidement entre 1971 et 2001. Selon nos projections, ces R.M.R. augmenteront de seulement 10% durant cette période. Parmi celles-ci, nous retrouvons Chicoutimi-Jonquière, Regina, Saint Jean (N.B.) et Thunder Bay.

Nous prévoyons une quasi stabilité de la fraction des canadiens habitant les 22 R.M.R., celle-ci passant de 55 à 57%, au cours des 30 années de la période de projections. Des 5 régions canadiennes, seules le Québec et les Prairies connaîtront une hausse substantielle du pourcentage de la population résidente dans les zones métropolitaines, alors qu'il y aura diminution en Ontario, stabilité à un niveau sensiblement supérieur à 20% dans les Maritimes, décroissance durant la période 1971-1981 puis retour à son niveau de 1971 en Colombie-Britannique. En somme, dans la mesure où les composantes démographiques futures évolueront en conformité avec nos hypothèses, l'on ne doit pas s'attendre à ce que la proportion de la population canadienne résidant dans les 22 R.M.R. augmente fortement

d'ici l'an 2001.

Conformément aux tendances passées, la distribution spatiale future montre un déplacement du centre de gravité urbain de la côte est vers le centre ouest canadien. Ainsi, une fraction de plus en plus importante de la population canadienne habitera les Prairies et la Colombie-Britannique, au détriment du Québec et des Maritimes. Seule la part relative de l'Ontario devrait se maintenir.

La trajectoire de la population future aura un impact sur la vie économique et sociale. Dans les lignes qui vont suivre, nous mentionnerons quelques problèmes soulevés par la croissance démographique d'ici la fin du siècle.

La vague de naissances durant la période 1945-1960 forme aujourd'hui la population d'âge 15-25, groupe qui, de par son importance, exerce certaines pressions sur le marché du travail, la demande de logement, etc. Ces pressions devraient se résorber au cours de la seconde moitié de la décennie 1980. Toutefois l'apparition de nouvelles valeurs et normes sociales tant dans le monde du travail que dans le milieu familial pourrait signifier un accès accru de la femme au marché du travail.

Manifestement, des changements dans la structure d'âge d'une population entraînent des modifications dans la demande de logements via la création de nouveaux ménages. Ainsi, le fort accroissement des personnes âgées de 35-44 au cours de la période 1971-1981 entraînera une hausse de 25% des ménages. La formation de ménages n'augmentera que de 10% pour les gens âgés entre 45 et 54 ans, de 25% pour ceux entre 55 et 64 et finalement d'un peu plus de 35% pour les gens âgés de 65 ans et plus. De telles augmentations exerceront de fortes pressions à la hausse sur la demande de logements. En particulier, les Régions Métropolitaines de plus d'un million d'habitants con-

naîtront une hausse de 85% du nombre de ménages.

Conséquemment nous devons considérer les effets de ces nouveaux besoins sur la demande de terrains, qui dépendra en majeure partie de la densité de la population. L'expansion du territoire deviendra alors inévitable si la densité spatiale des ménages demeure constante.

Pour conclure, on peut mentionner un dernier problème soulevé par la croissance démographique des régions métropolitaines, celui du transport. Il deviendra de plus en plus difficile de minimiser les embouteillages routiers et de maximiser l'accessibilité à un lieu donné, spécialement pour les villes moyennes où l'on prévoit les taux de croissance démographique les plus élevés. La croissance des régions métropolitaines comportera aussi des effets néfastes sur l'environnement comme par exemple la transformation grandissante des terres arables en sol urbain et la pollution de l'air.

Preface

The growth in population and the formation of capital and technological change are the key variables which influence the economic development and the social and physical structure of the major urban centres in a country. Therefore, the examination of population prospects is essential for anticipating future requirements for the production of goods and services in these centres and for preparing to meet other demands that are more or less related to the broad economic issues. Among these demands urban planning plays a prominent role. The concern about the uneven distribution of population growth not only between regions but even more between urban centres requires the preparation of detailed projections.

The emphasis in this report is on the 22 Census Metropolitan Areas. An attempt is made to classify the metropolitan areas by four levels according to population size. It is recognized that many other classifications are possible such as by functions, cluster around the largest metropolitan centres, corridors, etc.

In this context, it must be stressed that a considerable proportion of the population growth, exceeding 50 percent in some regions, is expected to occur outside the current metropolitan areas over the next 26 years. The absorption of this growth outside the established metropolitan areas confronts urban planners and decision makers with problems even more complex than the projected increase in population within the metropolitan areas. In all likelihood, a considerable proportion of the growth will occur just outside the fringes of metropolitan areas with the economic and cultural activities closely tied to the metropolitan centres. This development presents a challenge for regional and metropolitan growth management.

A range of five projections was developed based on

four principal variables: fertility, mortality, net international migration and net internal migration.

It must be added that projections get rather quickly outdated even in the course of a few years. For example, the projections in "Urban Canada: Problems and Prospects" appear far too high today. Both Canada's population as a whole and those of the metropolitan areas have proven to grow at a slower rate than expected. In spite of this note of caution, it can be stated that Canada is in a period of relatively slow population expansion after the rapid growth experienced in the first two decades after World War II. The "baby boom" and the heavy inflow of newcomers to Canada were the trademarks of this period.

The implications of the post-war baby boom are already being felt in an increase in the formation of new family households and also in a host of areas such as in the demand for housing, appliances, etc. It will result in an upturn in the number of births, creating a new bulge in the population distribution that will again fill the classrooms of primary and secondary schools.

The breakdown of the population by age groups is essential for obtaining an understanding how future burdens will be distributed among the population. For instance, looking forward to the middle of the eighties, it becomes obvious that Canada's population is aging rapidly. A smaller proportion -- despite the expected increase in the total number of births -- will be in the age groups under 20 years while a larger proportion will be in the middle age groups and in the post-retirement age group. While the children dependency ratio is expected to decline sharply, the retirement dependency ratio is on the increase.

The projections pay particular attention to the household formation by type of households. Out of

it arise major implications for housing and land requirements, transport and management of environment. The projections do not claim to deal with all the major impacts of changes in population growth and its distribution. The basic assumption underlying all these consequences is that they will occur predominantly in and around Canada's metropolitan areas.

Last March, the Demographic Research Group under the direction of Dr. T.H. Yoo, released a draft report with the same title as this document in order to meet the immediate need of the Ministry and the requirement of other federal departments. Since then, we have received a large number of requests from federal, provincial and municipal government agencies, universities and other private sectors for the projections. In order to respond to these increasing requests, we prepared this reduced report. This condensed report is prepared by Dr. Leroy Stone, Senior Demographic Adviser of Statistics Canada with the assistance of the Demographic Research Group of the Ministry.

H.L. Laframboise,
Assistant Secretary
Policy and Research Wing

Contents

Abstract	iii
Résumé	vii
Preface	xi
1 Projection assumptions	1
2 Future metropolitan population growth	5
3 Concentration of the national and regional population in CMA's	40
4 Selected implications of metropolitan population growth	45
4.1 Labour force	45
4.2 Households	45
4.3 Land requirements	52
4.4 Transportation and environment	57
Notes	65
References	67
Tables	
1 Assumptions used in the population projection series	4
2 Historical and projected metropolitan population by year and series of projection, 1961-2001 (in millions)	6
3 Historical and projected average annual growth rates, Canada and CMA's as a group, 1961-66 to 1996-2001	8
4 Projected metropolitan population for the year 2001 expressed as a percentage of the 1971 population by projection series	10
5 Total projected population for each metropolitan area as per Series 3 (in 000's)	37
6 Average annual projected population increase for each metropolitan area as per Series 3 (in 000's)	38
7 Comparison of Series 3 projected metropolitan population with regional projected population as per Statistics Canada projections, Series 11, 1971-2001 (in 000's)	41
8 Projected regional distribution by metropolitan area population as per Series 3 (in 000's)	42
9 Total projected population in the age group 15-64 for each metropolitan area as per Series 3, 1971-2001 (in 000's)	46

10	Proportions of the 10 year age groups who head family households in three CMA's, 1971	48
11	Propensities for selected age groups to form non-family households (in percent) 1971	49
12	Increase in total households for each metropolitan area, Series 3, 1971-1981	51
13	Projection density by age group (percent)	54
14	Residential land requirements by metropolitan area for selected CMA's (Series 3) 1971-1981 (000's of acres)	56

Figures

1	Percentage change in total metropolitan population by projection series, 1971 to 2001	7
2	Historical and projected population for individual CMA's	12
3	Number of metropolitan areas by annual arithmetic growth rate by percentage classes 1971-1976 and 1976-1981	34
4	Projected percentage increase in households by age group, Series 3, 1971-1981	53

Appendix	58
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Ministry publications 1975	69
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1 Projection assumptions

This document presents the latest series of population projections for 22 1971 Census Metropolitan Areas (CMA's) prepared at the Ministry of State for Urban Affairs. For each CMA five different projections Series are presented. Each series sets forth the results of a particular network of assumptions concerning possible values of the immediate determinants of population growth. These assumptions are NOT predictions about the future. They merely state plausible conditions and then the consequences of these conditions are calculated as projections. Thus NONE of these projections should be interpreted as predictions about the future. However, they do indicate the population totals that would be observed in the future IF the relevant set of assumptions were to hold true in the future.

In developing the five sets of assumptions, the demographic processes of fertility, mortality and migration were the objects of attention. The assumptions made concerning these three population processes may briefly be summarized as follows.¹

As regards fertility, the assumptions in the recent Statistics Canada projections² were followed for the most part. The assumptions are stated in terms of a fertility index called the "Total Fertility Rate", which is the average number of children per woman that a cohort of females would bear if it had no deaths during the reproductive ages and maintained a specific rate of fertility at each age. Four levels of the Total Fertility Rate (T.F.R.) were selected as assumptions. For each assumption the T.F.R. is considered as moving gradually towards a given level between 1971 and 1981, and then after 1981 the level is assumed to remain constant. The levels are as follows:

High:	T.F.R. = 2.4 after 1981
Moderate:	T.F.R. = 2.2 after 1981

Moderately Low: T.F.R. = 1.8 after 1981

Low: T.F.R. = 1.6 after 1981

Only one assumption is made throughout this text concerning mortality. Mortality levels are kept constant at their 1971 values.

In formulating assumptions about migration it is helpful to differentiate between internal migration and international migration.³ It is assumed that the levels of net internal migration rate will remain constant throughout the projection period at their 1966-1971 values.

The Ministry of State for Urban Affairs' analysis of international migration has indicated substantial stability in the distribution of immigrants among urban areas. In the present projection Series, it is assumed that the average distribution of international migrants among the CMA's between the years 1966-1971 would remain constant throughout the projection period.

Regarding the absolute level of net international migration, we adopted assumptions formulated by the Privy Council. Three assumptions are involved: 200,000 net international migrants annually as a high projection; 100,000 net international migrants annually as a moderate projection; and 50,000 net international migrants annually as a low projection.

The foregoing assumptions concerning three demographic processes were then combined into five sets of assumptions, each of which is called a "Series" and has a designated number as shown in Table 1.

In the following chapters of this paper a variety of projections are presented in association with each of the five series. From time to time special attention will be paid to the middle series, series 3; but this fact should NOT be taken to imply a judgement that series 3 is the most plausible. To facilitate the reader's interpretation of the numbers we merely focus

occasionally on one series, number 3, that is broadly representative of the whole set of numbers.

As mentioned above, the data refer to 22 1971 Census Metropolitan Areas (CMA's). No 'growth' due to areal expansion is explicitly assumed in this report. It is reasonable to suppose that much of the projected population growth could be associated with areal expansion.

Table 1 Assumptions used in the population projection series

Series number	General character	Assumptions		
		Mortality	Fertility (T.F.R.)	Net external migration
Series 1	High	1971 level	2.4 children per woman	200,000 per year
				1966-1971 level
Series 2	Moderately high	1971 level	2.2 children per woman	200,000 per year
				1966-1971 level
Series 3	Moderate	1971 level	2.2 children per woman	100,000 per year
				1966-1971 level
Series 4	Moderately low	1971 level	1.8 children per woman	100,000 per year
				1966-1971 level
Series 5	Low	1971 level	1.6 children per woman	50,000 per year
				1966-1971 level

2 Future metropolitan population growth

By the turn of the 21st century, at least 15 million Canadians may reside in the present Census Metropolitan Areas; but the actual total may reach as high as 21 million, if the range of assumptions embodied in these projections is reasonable. The figure of 21 million metropolitan area residents by the year 2001 is obtained by assuming that Canada will retain an annual average net international migration of 200,000 and that the fertility index (T.F.R.) will stand at 2.4 children per woman (from 1981 to 2001). To obtain the 15 million total mentioned above, it is assumed that the net international migration will average only 50,000 per year and that the fertility index will remain at only 1.6 children per woman from 1981 to 2001. Table 2 shows three less extreme projected metropolitan area population totals for the year 2001, along with portions of the assumptions that led to these totals.

By 1981, the population residing in the present 22 Census Metropolitan Areas will, given the projection assumptions, reach a total size somewhere between 13 and 15 million. This range implies that as a whole the metropolitan areas will grow at a rough annual average rate of somewhere between 1.2 and 2.4 percent from 1971 to 1981. Under either of these two growth rates, the population of the 22 1971 Census Metropolitan Areas would almost double as a minimum in the 40 years from 1961 to 2001.

By the year 1981 the total population of the 22 1971 CMA's could be as much as 20 percent larger than its size in 1971. The projections suggest that the 1981 population will be at least 10 percent larger (Figure 1). Starting from the 1971 Census base figure, the projections imply an overall growth to 2001 of somewhere between 30 and 80 percent for the 22 CMA's.

Table 3 shows computed average annual growth rates for Canada and for the group of 1971 Census CMA's.

Table 2 Historical and projected metropolitan population* by year and series of projection
1961-2001 (in millions)

Historical population		Selected projection assumptions		Total projected metropo- litan population			
		Total fertility rate	Net external migration				
1961	1966	1971		1981	1991	2001	
9.3**	10.7**	11.9	1.6 (Series 5)	50,000	13.3	14.5	15.7
			1.8 (Series 4)	100,000	13.7	15.6	17.4
			2.2 (Series 3)	100,000	13.8	16.1	18.4
			2.2 (Series 2)	200,000	14.6	17.7	20.9
			2.4 (Series 1)	200,000	14.7	18.0	21.5

* The totals refer to the combined area of the 22 1971 Census Metropolitan Areas.

** Areas as of 1971.

Source: Historical data from Census of Canada.

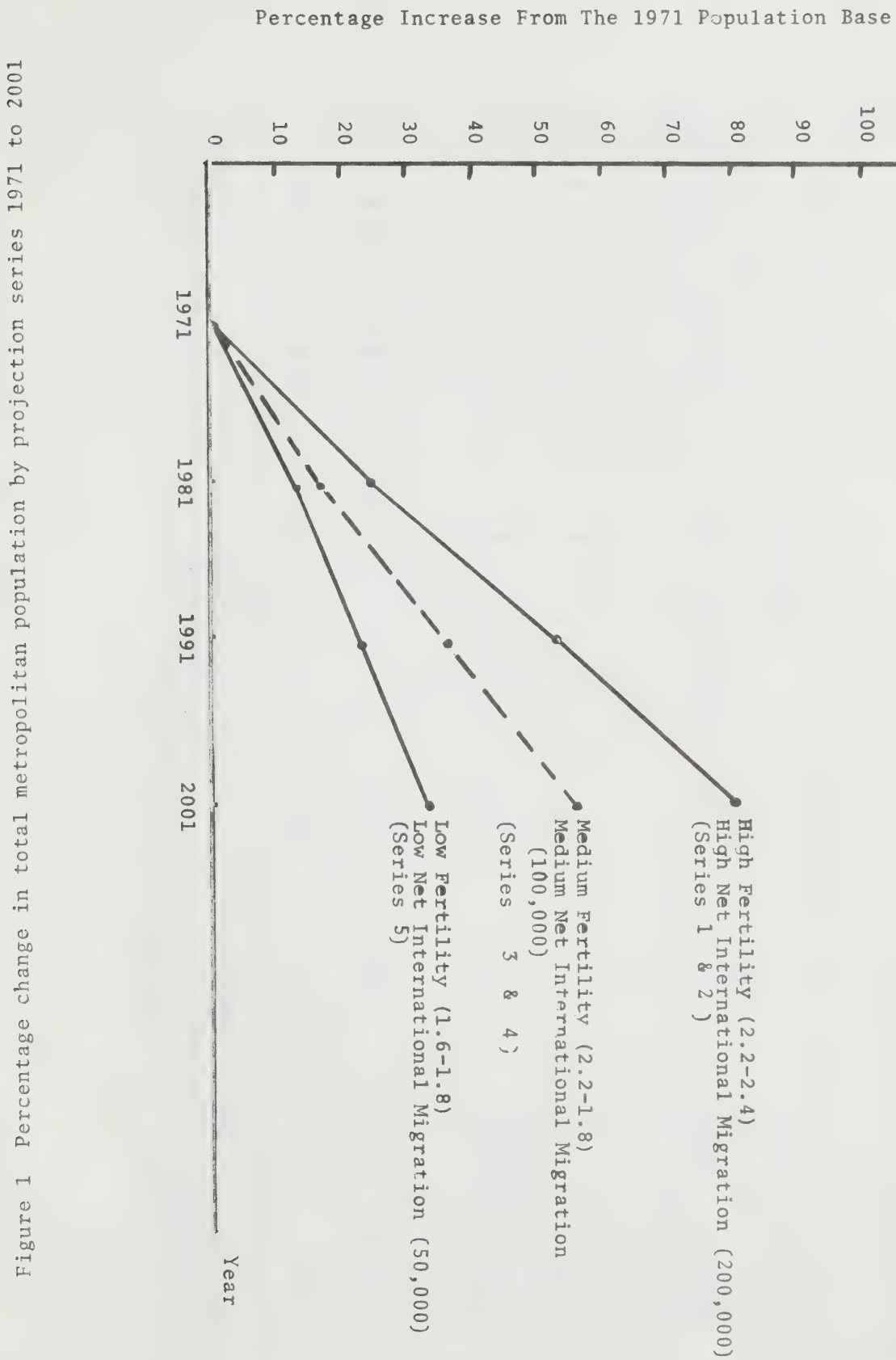


Table 3 Historical and projected average annual growth rates, Canada and the CMA's as a group, 1961-66 to 1996-2001*

	Historical					Projected				
	1961-66	1966-71	1971-76	1976-81	1981-86	1986-91	1991-96	1996-2001		
Canada Hypothesis A - No. 12	1.89	1.51	1.24	1.27	1.27	1.10	0.89	0.74		
22 CMA's Series No 4	2.99	2.23	1.52	1.46	1.33	1.26	1.16	1.05		
Canada Hypothesis B - No. 11	1.89	1.51	1.30	1.57	1.59	1.38	1.15	1.05		
22 CMA's Series No 3	2.99	2.23	1.52	1.60	1.63	1.54	1.42	1.30		

* The first and third rows are from the recent Statistics Canada projections (cf: Statistics Canada, op.cit). The basic assumptions of the first two rows are roughly comparable. The basic assumptions of the second two rows are roughly comparable.

The roughly comparable projection assumptions, comparing the Statistics Canada work and the MSUA work, imply a marked narrowing of the gap between the national growth rate and that for the metropolitan areas as a group. This result is partly affected by the modest level of annual net international migration (100,000 per year) that is assumed. The assumptions also imply that Canada will not witness again in this century the extremely rapid rates of total metropolitan population growth that were evident in the fifties and much of the sixties.

Table 4 shows the detailed figures of 1971-2001 percentage growth for each of the 22 CMA's under each of the five sets of assumptions. Each column of Table 4 shows the data for one projection series. Abbreviated names for the CMA's are listed in rank order according to the projected ratio of 2001 population size to 1971 population size. For example, under the Series 1 assumptions Calgary grows the fastest, and by the year 2001 its population will be 287 percent of its 1971 population. In sharp contrast, Saint John (N.B.) grows the slowest in Series 1 with its 2001 population being only 8 percent larger than its 1971 population.

The projections imply (Table 4) that the five fastest growing CMA's will be located in the western half of Canada. They are Calgary, Edmonton, Sudbury, Vancouver and Victoria. Calgary is projected to at least double its population between 1971 and 2001 under all five series. Vancouver is projected to double its population under three of the five series while Edmonton, Sudbury and Victoria will double their populations under two of the five series. Central Canada contains most of the other metropolitan areas that are generally projected to grow by at least 50 percent between 1971 and 2001. This group is led by Ottawa-Hull, which nearly doubles its population under two

Table 4 Projected metropolitan population for the year 2001 expressed as a percentage of the 1971 population by projection series

Series 1	Series 2	Series 3	Series 4	Series 5
Calg. (287)	Calg. (279)	Calg. (250)	Calg. (237)	Calg. (216)
Vanc. (238)	Vanc. (232)	Vanc. (205)	Vanc. (194)	Sudb. (175)
Edm. (217)	Edm. (211)	Sudb. (197)	Sudb. (186)	Vanc. (175)
Sudb. (214)	Sudb. (208)	Edm. (192)	Edm. (181)	Edm. (168)
Vict. (210)	Vict. (205)	Vict. (189)	Vict. (179)	Vict. (166)
O.-H. (202)	O.-H. (197)	O.-H. (181)	O.-H. (171)	O.-H. (158)
Kitc. (195)	Kitc. (190)	Kitc. (177)	Kitc. (167)	Kitc. (156)
Lond. (194)	Lond. (189)	Lond. (168)	Lond. (158)	Que. (148)
Tor. (188)	Tor. (183)	Que. (165)	Que. (155)	Lond. (144)
Que. (173)	Que. (168)	Tor. (148)	Tor. (140)	Wind. (126)
Wind. (170)	Wind. (166)	Wind. (147)	Wind. (139)	St.C.-N. (121)
Ham. (159)	Ham. (154)	St.C.-N. (137)	St.C.-N. (129)	Tor. (119)
St.C.-N. (151)	St.C.-N. (147)	Hal. (136)	Hal. (128)	Hal. (119)
Mont. (150)	Mont. (146)	Ham. (135)	Ham. (127)	St.J's (116)
Hal. (149)	Hal. (145)	St.J's (132)	St.J's (123)	Ham. (114)
Winn. (147)	Winn. (143)	Mont. (130)	Mont. (122)	Sask. (111)
Sask. (145)	Sask. (141)	Sask. (128)	Sask. (121)	Mont. (110)
St.J's (143)	St.J's (139)	Winn. (125)	Winn. (117)	Winn. (105)
Reg. (121)	Reg. (117)	Chi-J. (108)	Chi-J. (101)	Chi-J. (96)
Thun.B. (117)	Thun.B. (114)	Reg. (107)	Reg. (100)	Reg. (92)
Chi-J. (115)	Chi-J. (111)	Thun.B. (104)	Thun.B. (98)	Thun.B. (90)
St.J. (108)	St.J. (105)	St.J. (101)	St.J. (94)	St.J. (89)
Tot.CMA's (180)	(176)	(155)	(146)	(131)

Assumptions: See Table 1

of the five series. The group also includes Kitchener-Waterloo, London, Toronto, Quebec, Windsor and Hamilton.

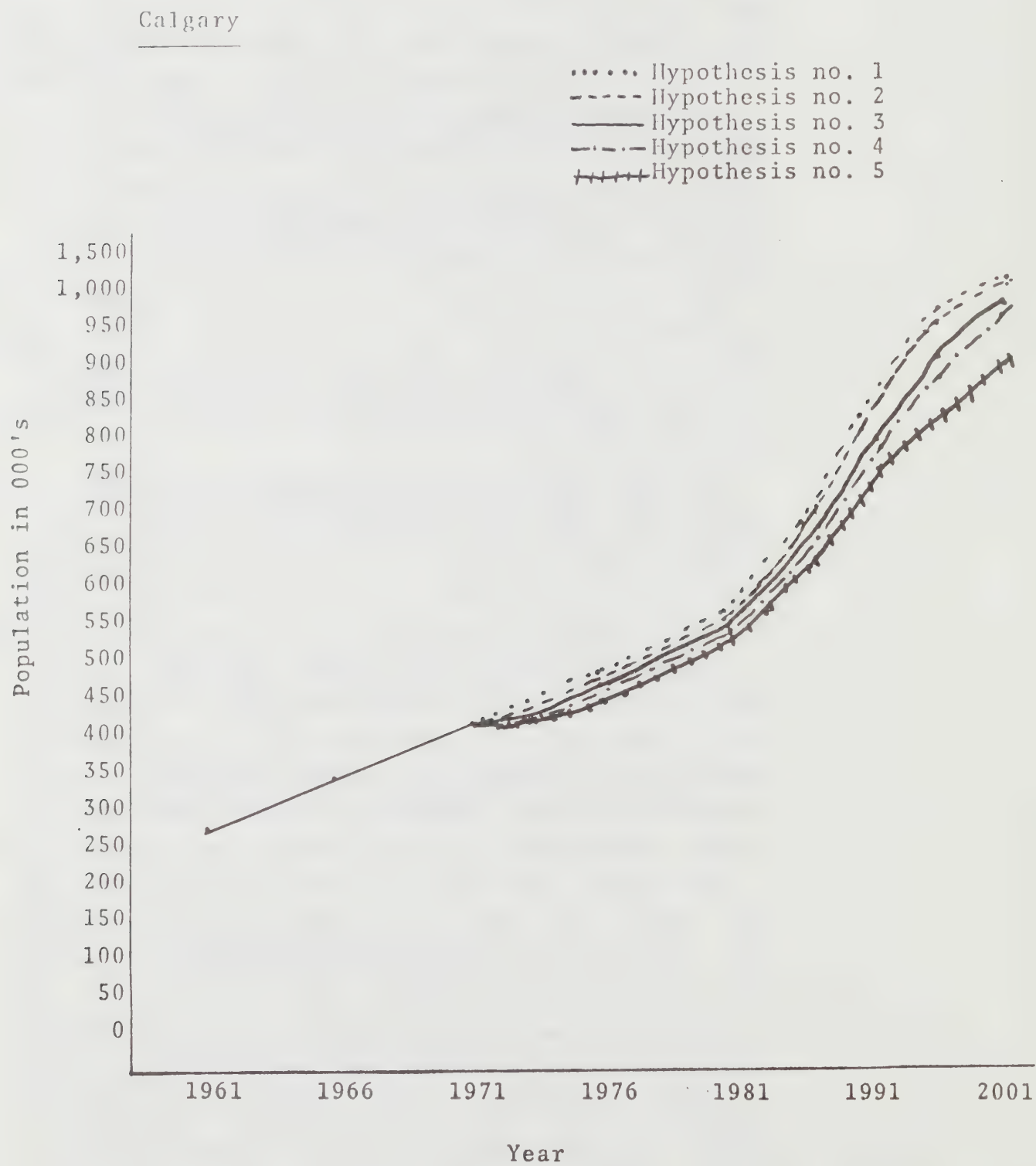
The slowest growing CMA's according to the projections, are generally among the smaller ones, and are located from the Prairies to the Atlantic Region. Generally these areas are projected as showing a growth of the rough order of 10 percent between 1971 and 2001. These areas include Chicoutimi-Jonquière, Regina, Saint John (N.B.) and Thunder Bay.

Figure 2 shows the projected population totals for each CMA under the five different Series. This figure brings out strikingly the major population expansion projected for several CMA's in the western and central regions of Canada.

Under the middle Series 3 assumptions, Calgary, Sudbury and Vancouver are projected as showing the fastest growth in both of the first two five-year periods into the future - 1971-76 and 1976-81 (Figure 3). Under Series 3, see Table 1 for details as to what is assumed in Series 3. Calgary will grow by over three percent in each of the first two five-year projection periods. The remaining CMA's with higher than average growth rates in these periods are (in alphabetical order) Edmonton, Kitchener-Waterloo, London, Ottawa-Hull, Quebec, Toronto and Victoria. In each of the first two five-year periods (1971-76 and 1976-81) the list of the four slowest growing CMA's is the same: Chicoutimi-Jonquière, Regina, Saint John (N.B.) and Thunder Bay.

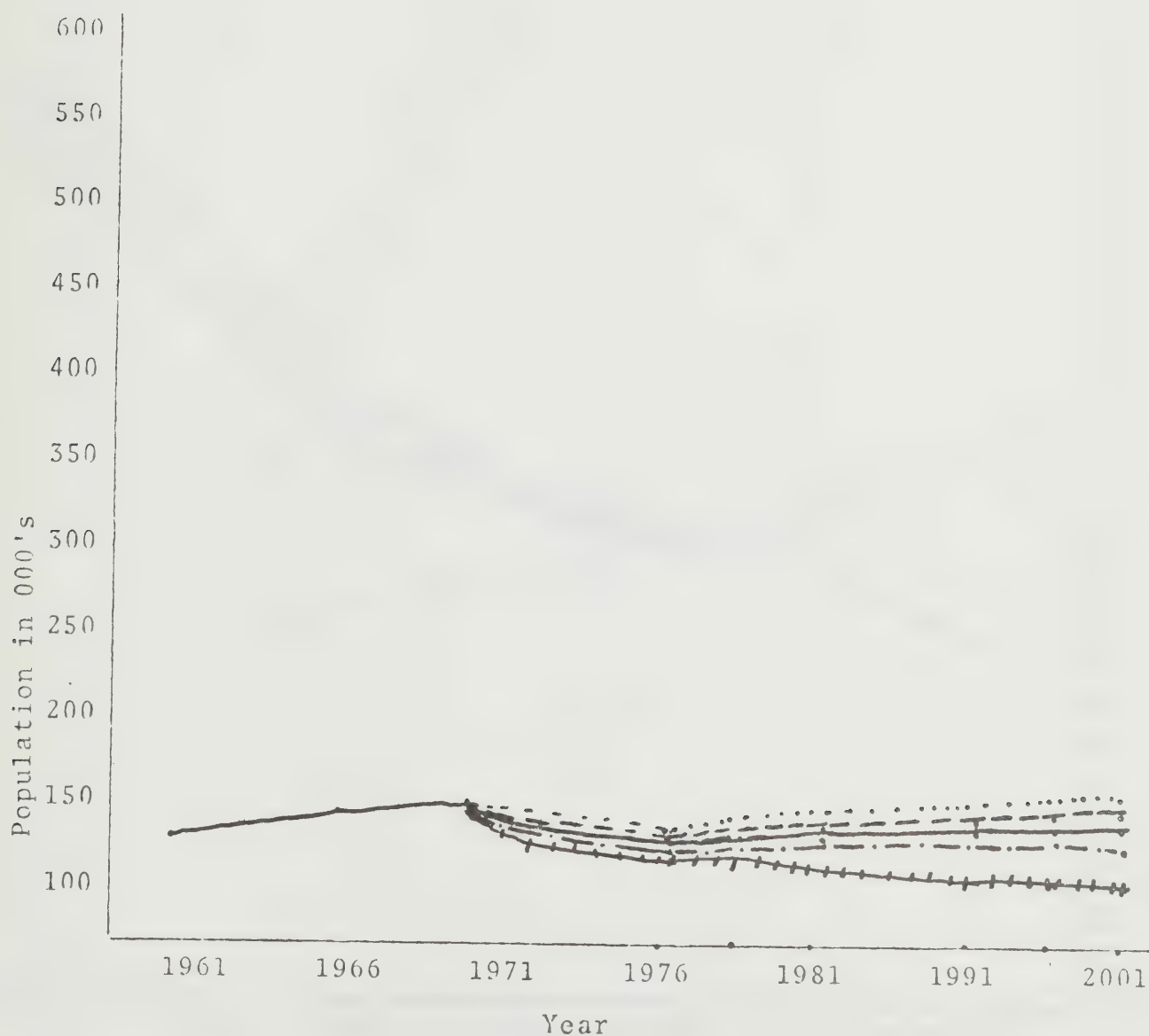
Because of their major importance in the Canadian economy, Montreal, Toronto and Vancouver deserve some additional commentary. The following comparative remarks will use only one of the five projections Series - Series 3 (see Table 1 for the pertinent details about this assumption). The Series 3 assumptions imply that by 1981 Toronto will become the

Figure 2 Historical and projected population for individual CMA's



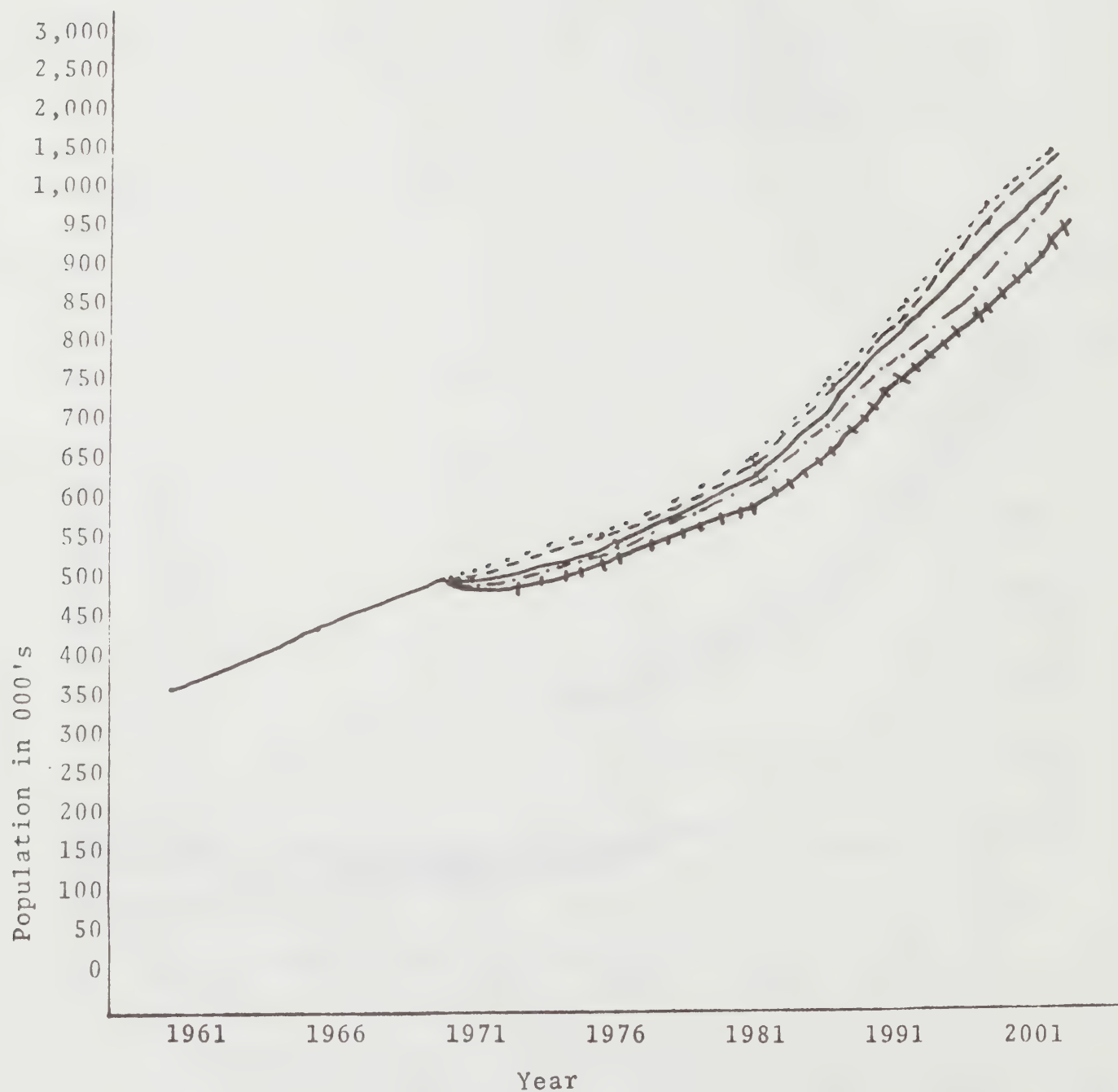
Chicoutimi-Jonquière

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-.-.-.- Series no. 4
+ + + + + Series no. 5



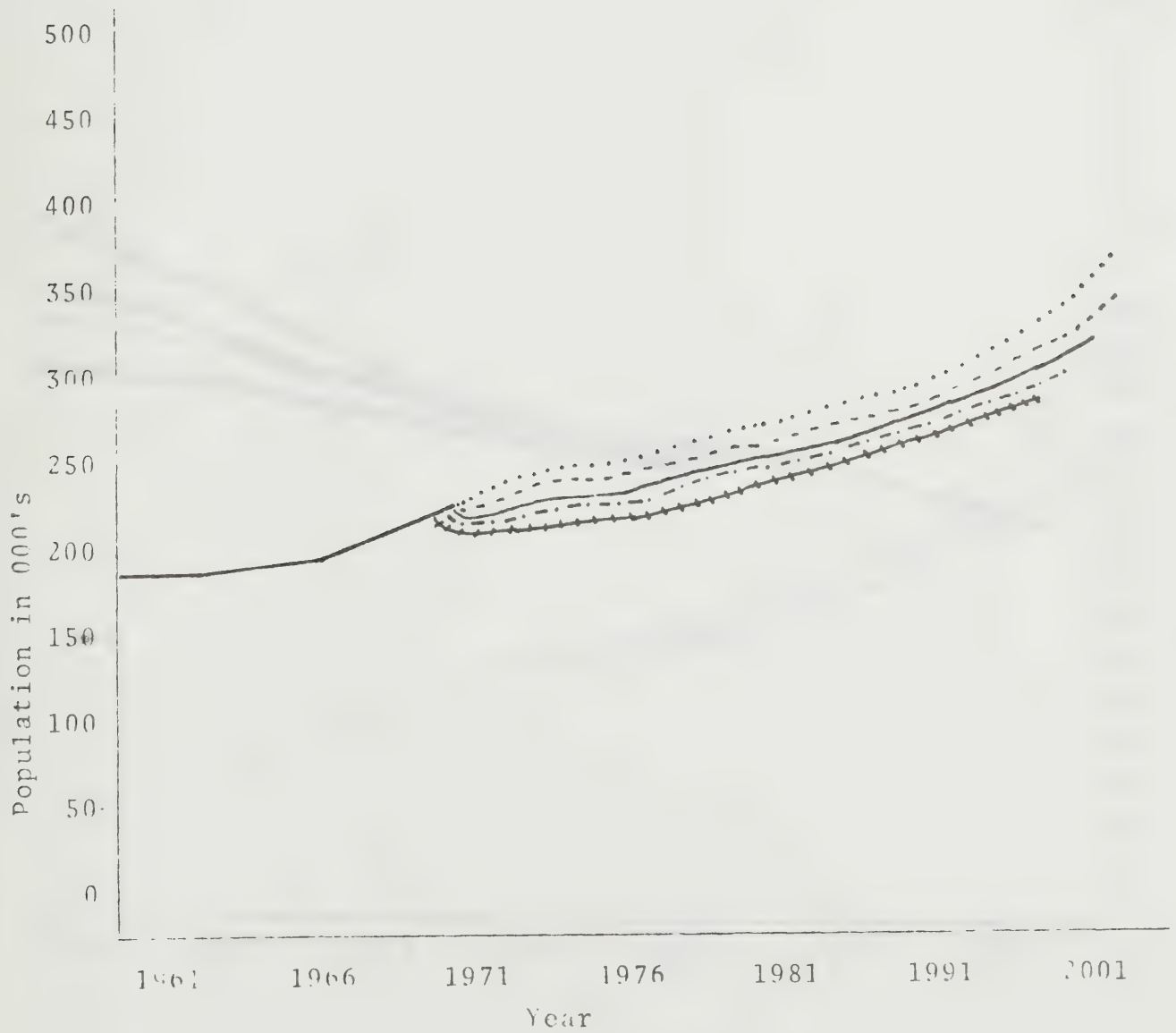
Edmonton

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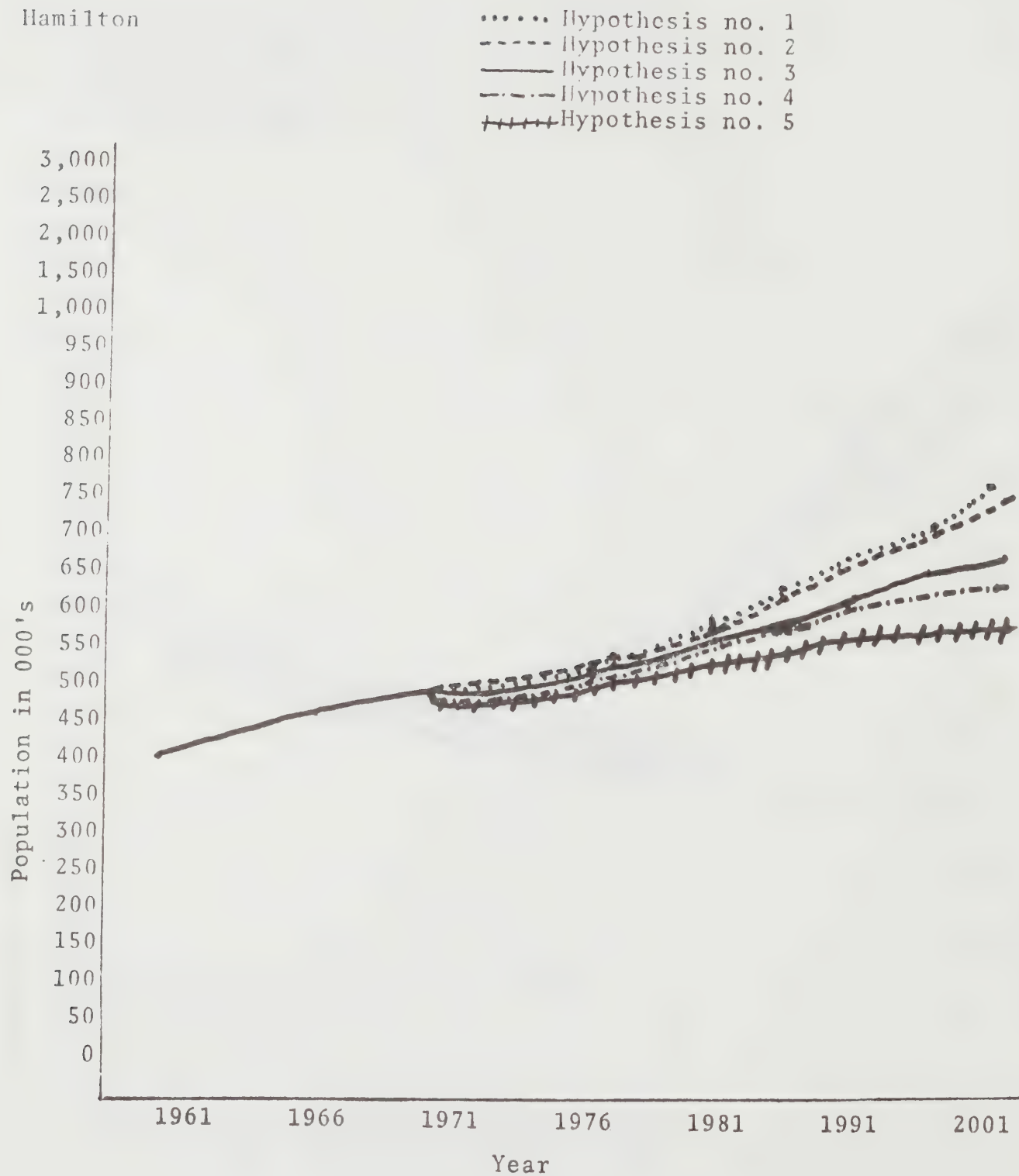


Halifax

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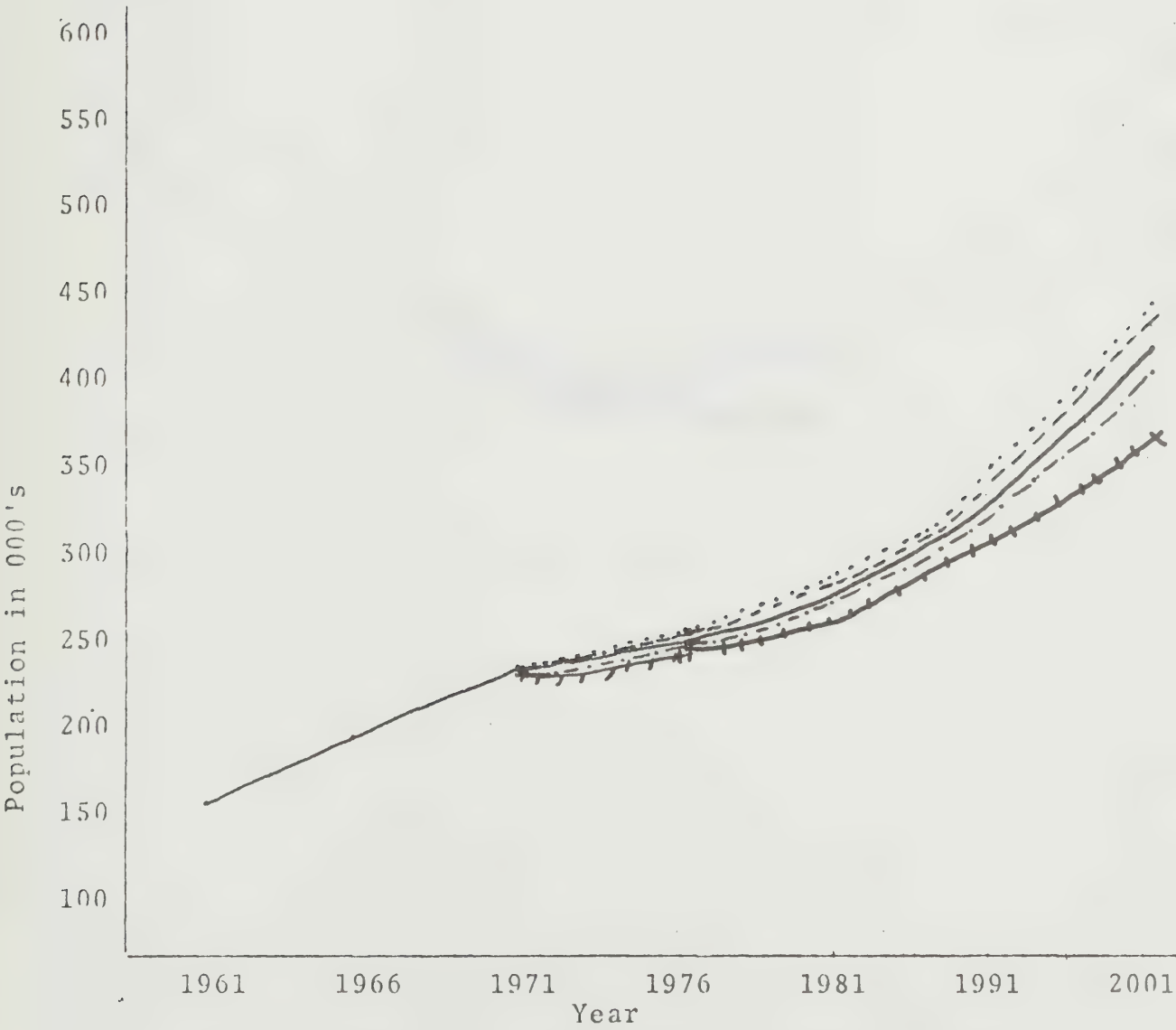


Hamilton



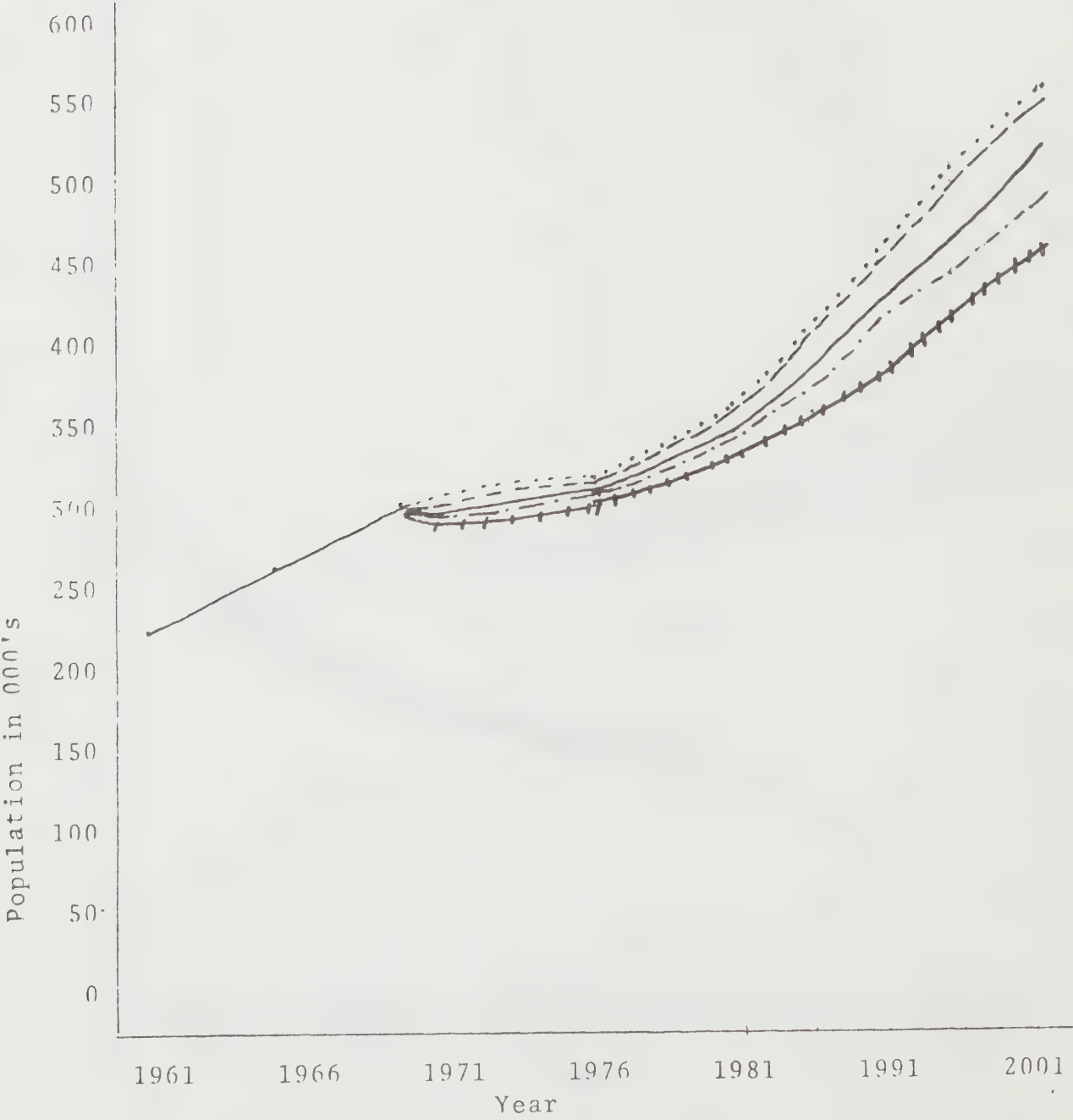
Kitchener

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- Series no. 2
- Series no. 3
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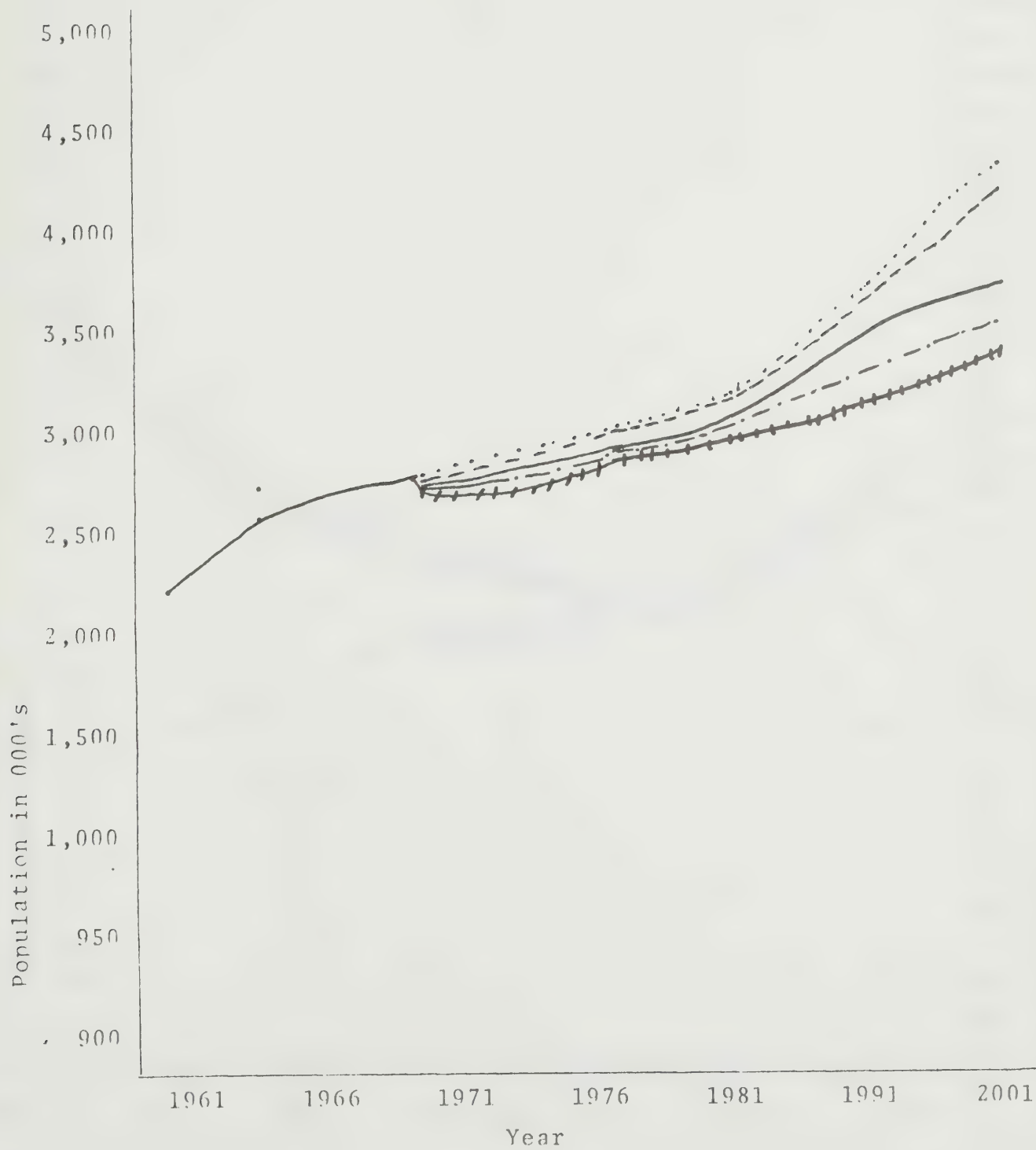
London

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- .-.-.- Series no. 4
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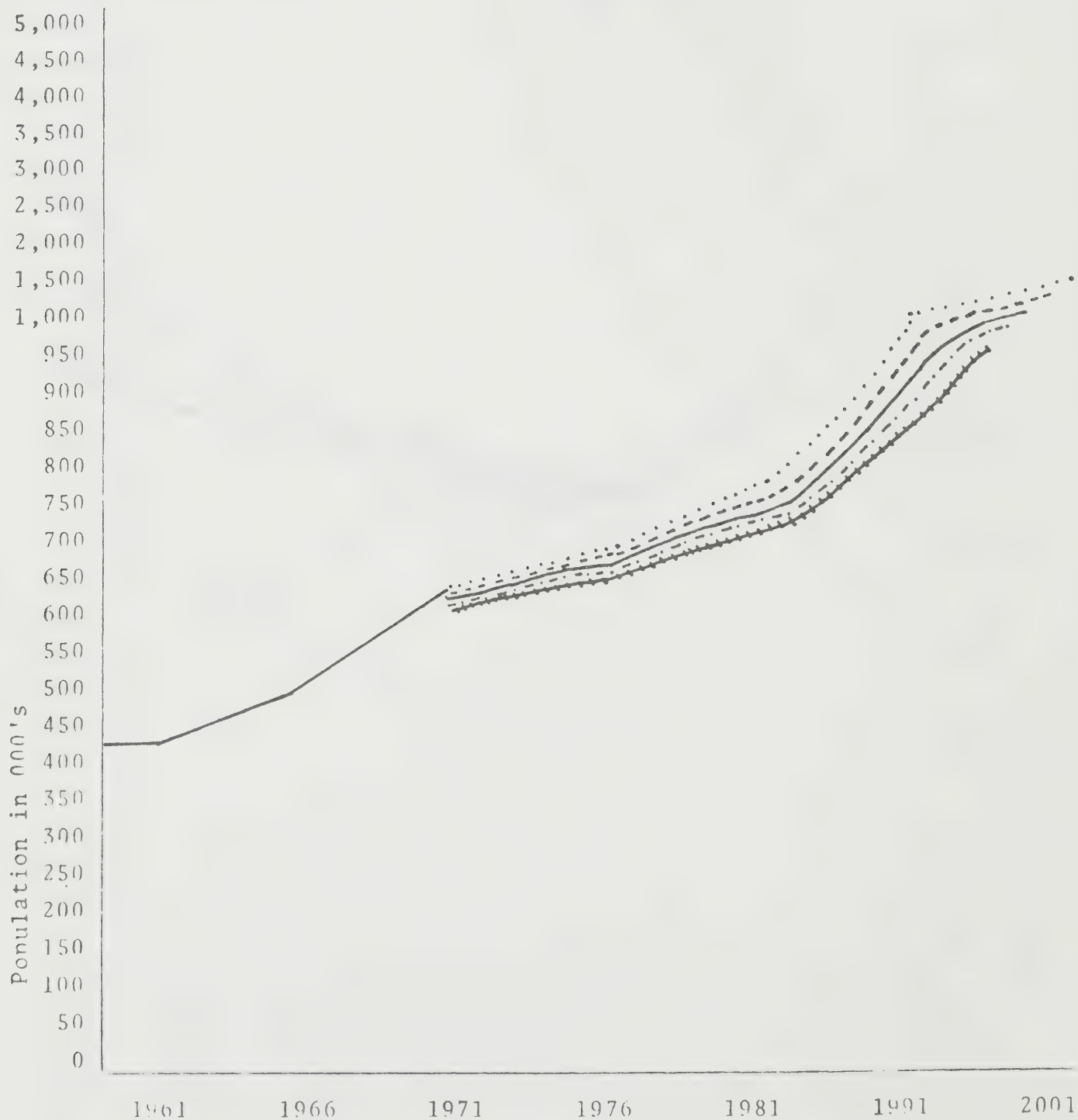
Montreal

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Ottawa-Hull

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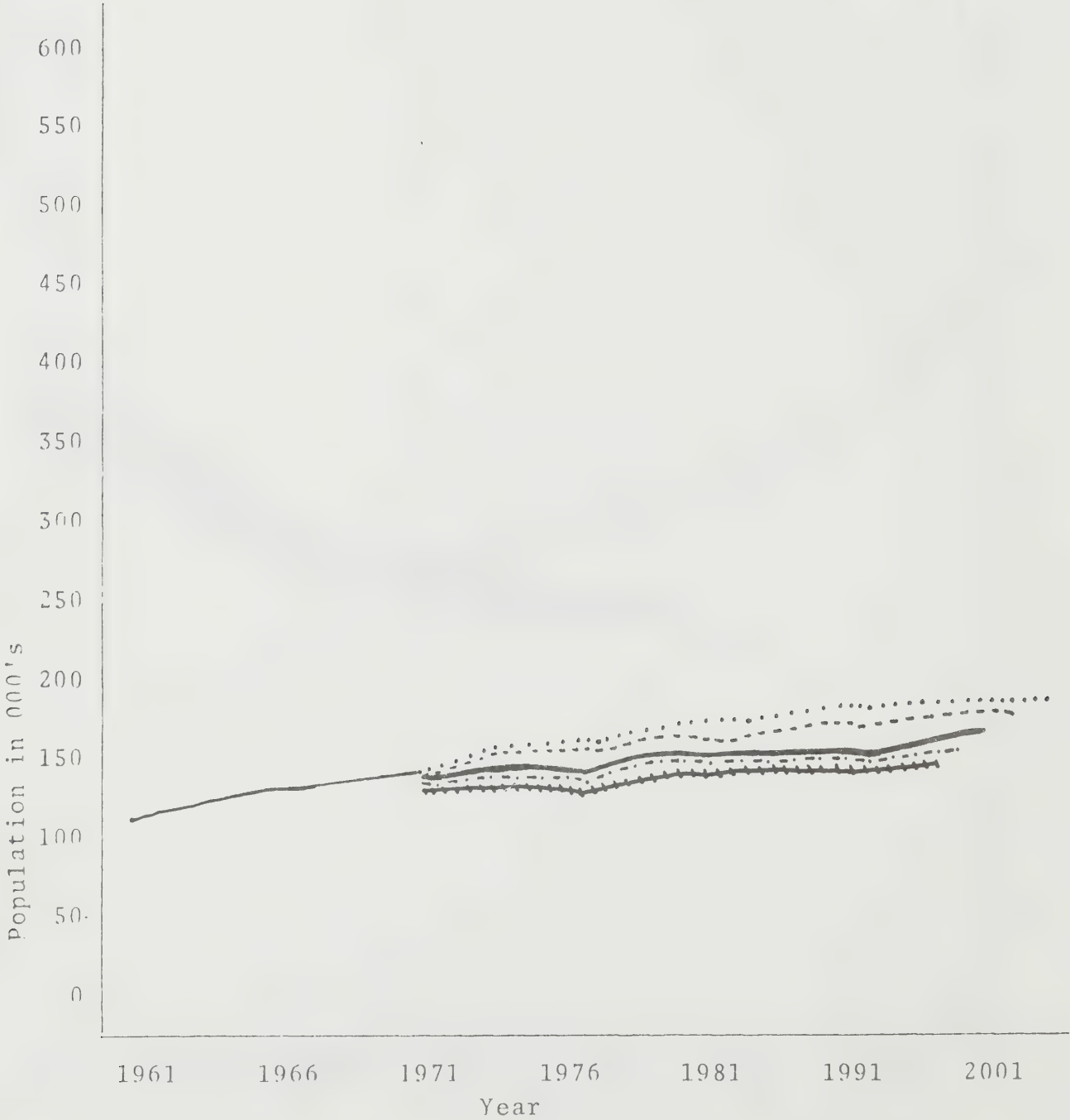
Quebec

- Hypothesis no. 1
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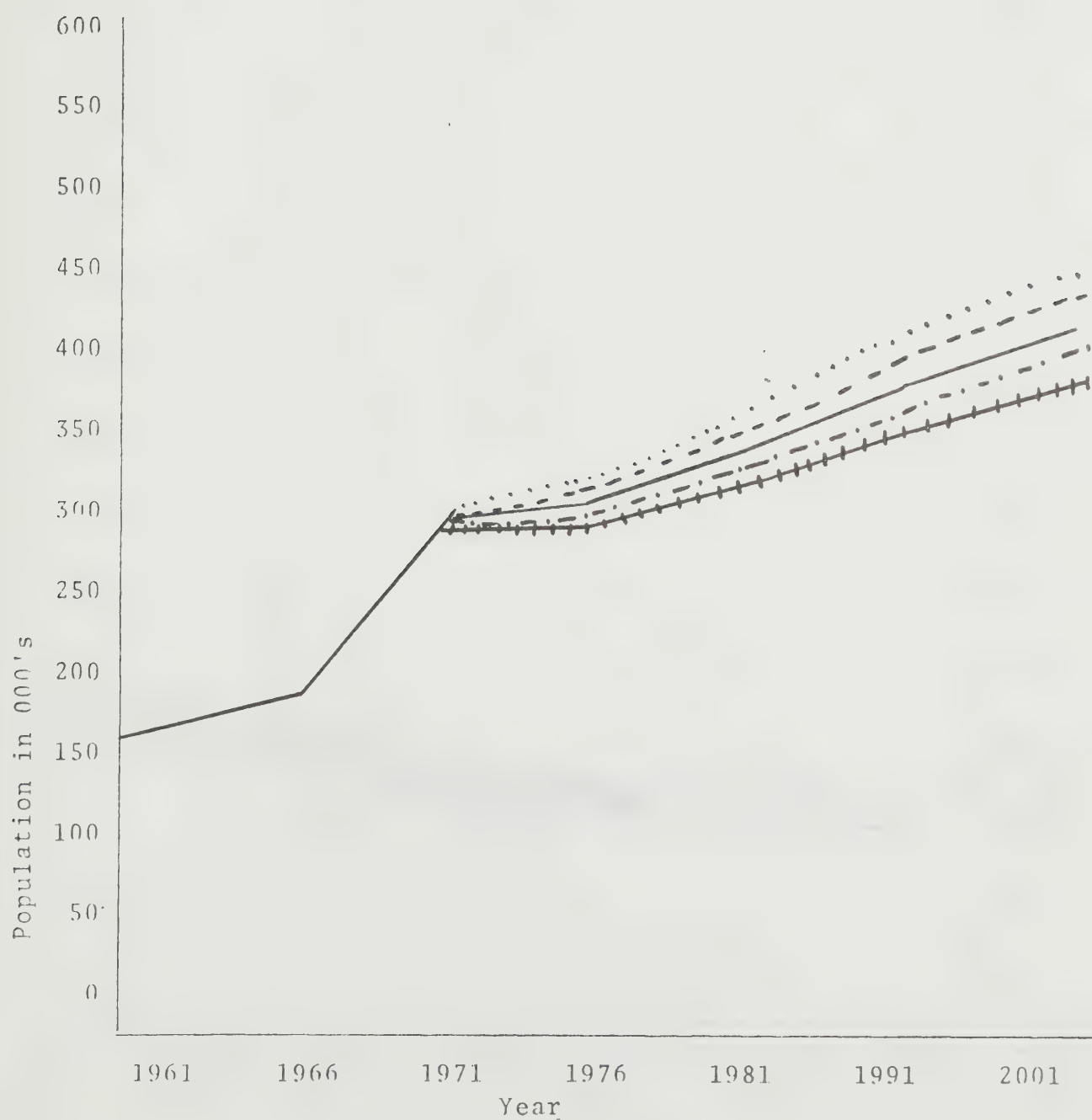
Regina

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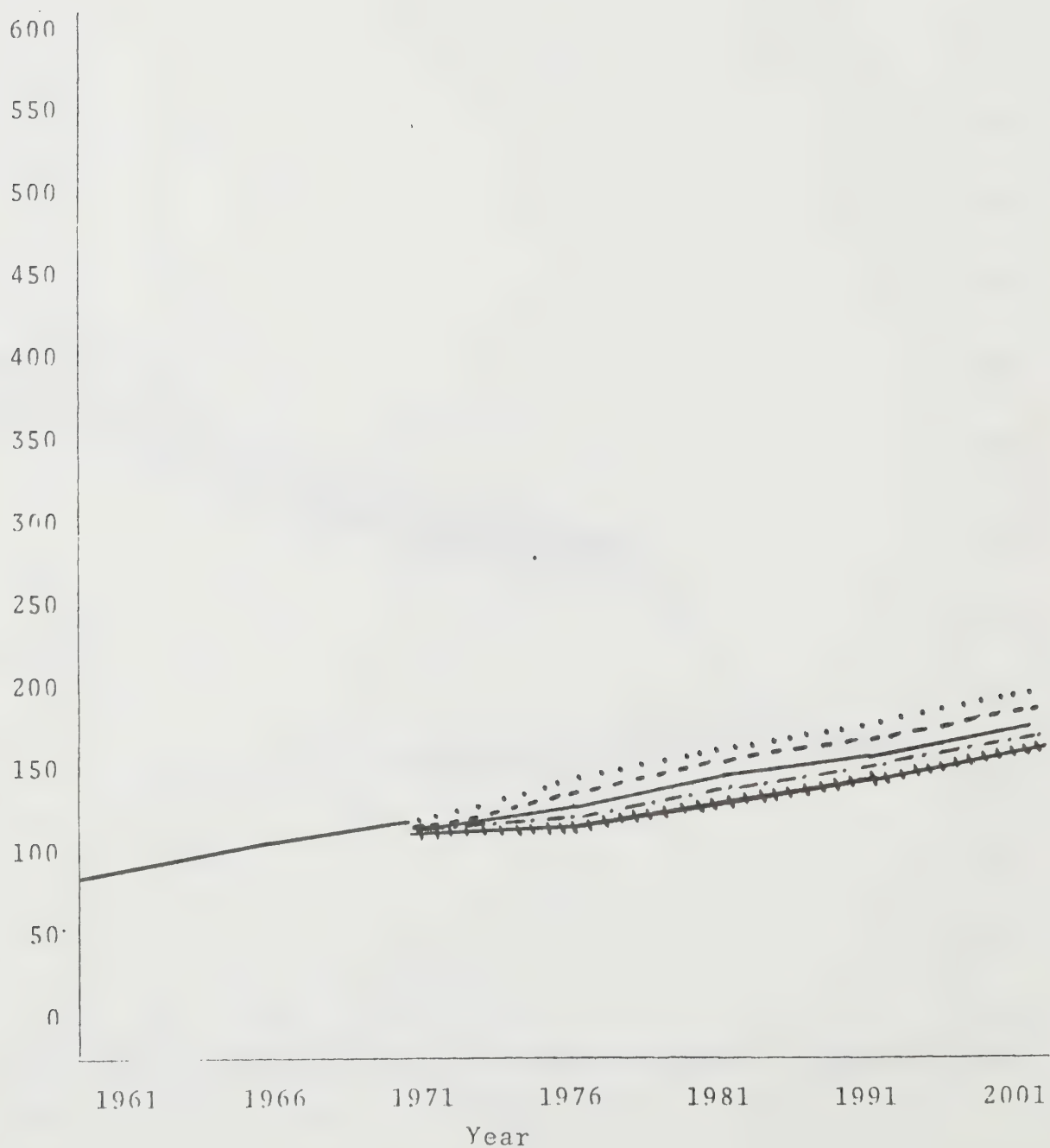
St. Catherines-Niagara

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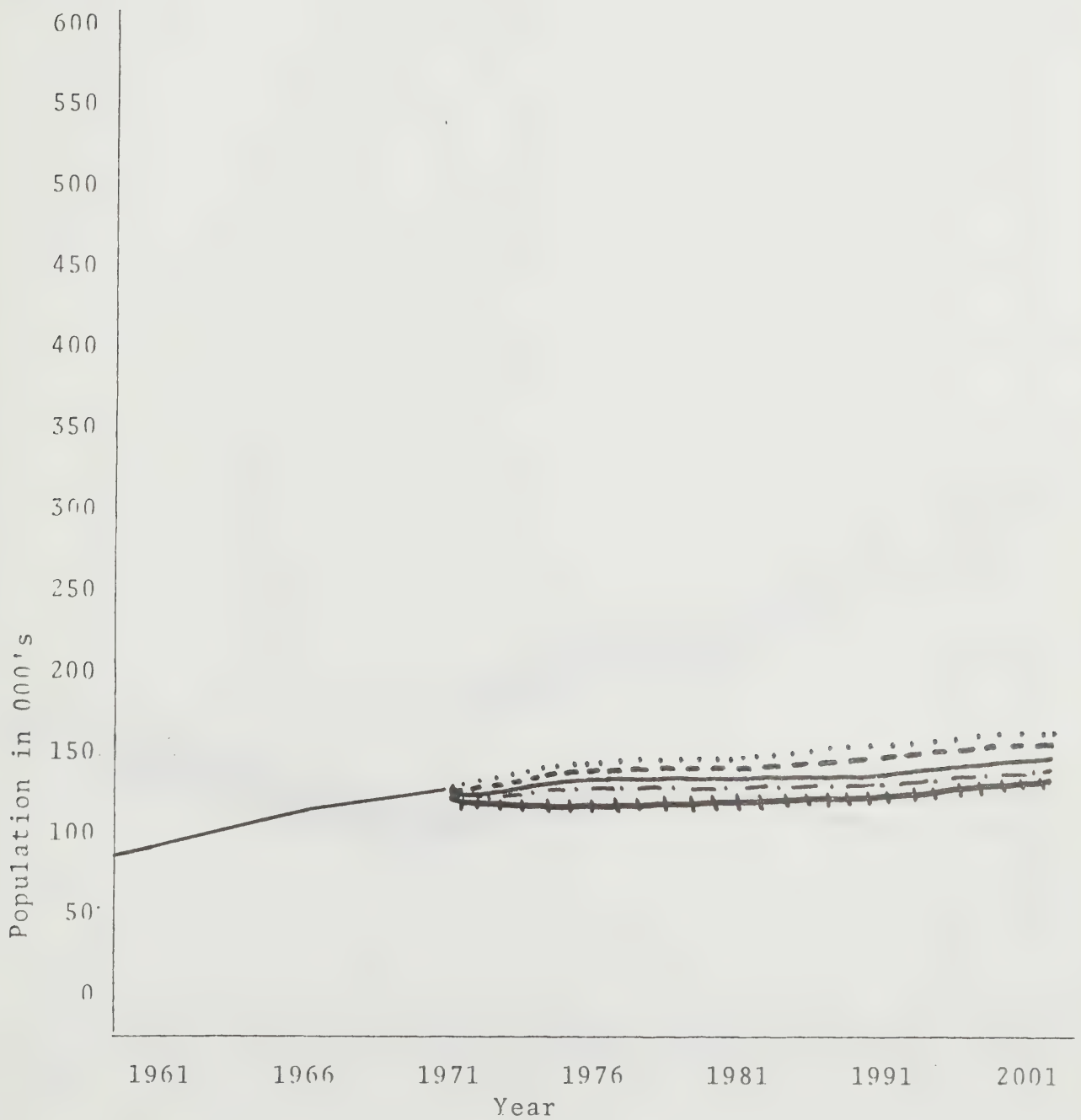
St. John's

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+ + + + +Series no. 5



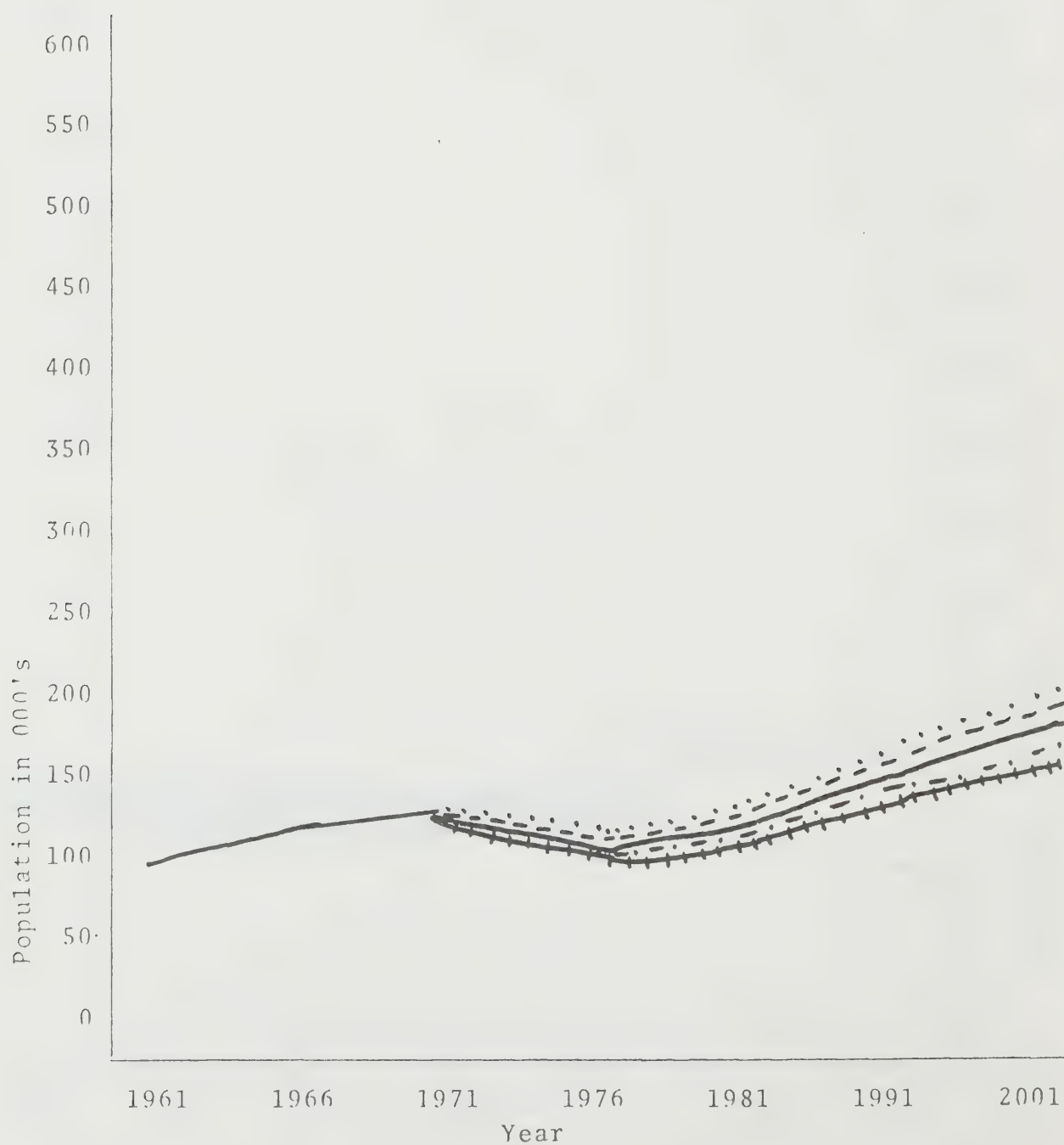
Saint John

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----- Series no. 3
----- Series no. 4
+----- Series no. 5



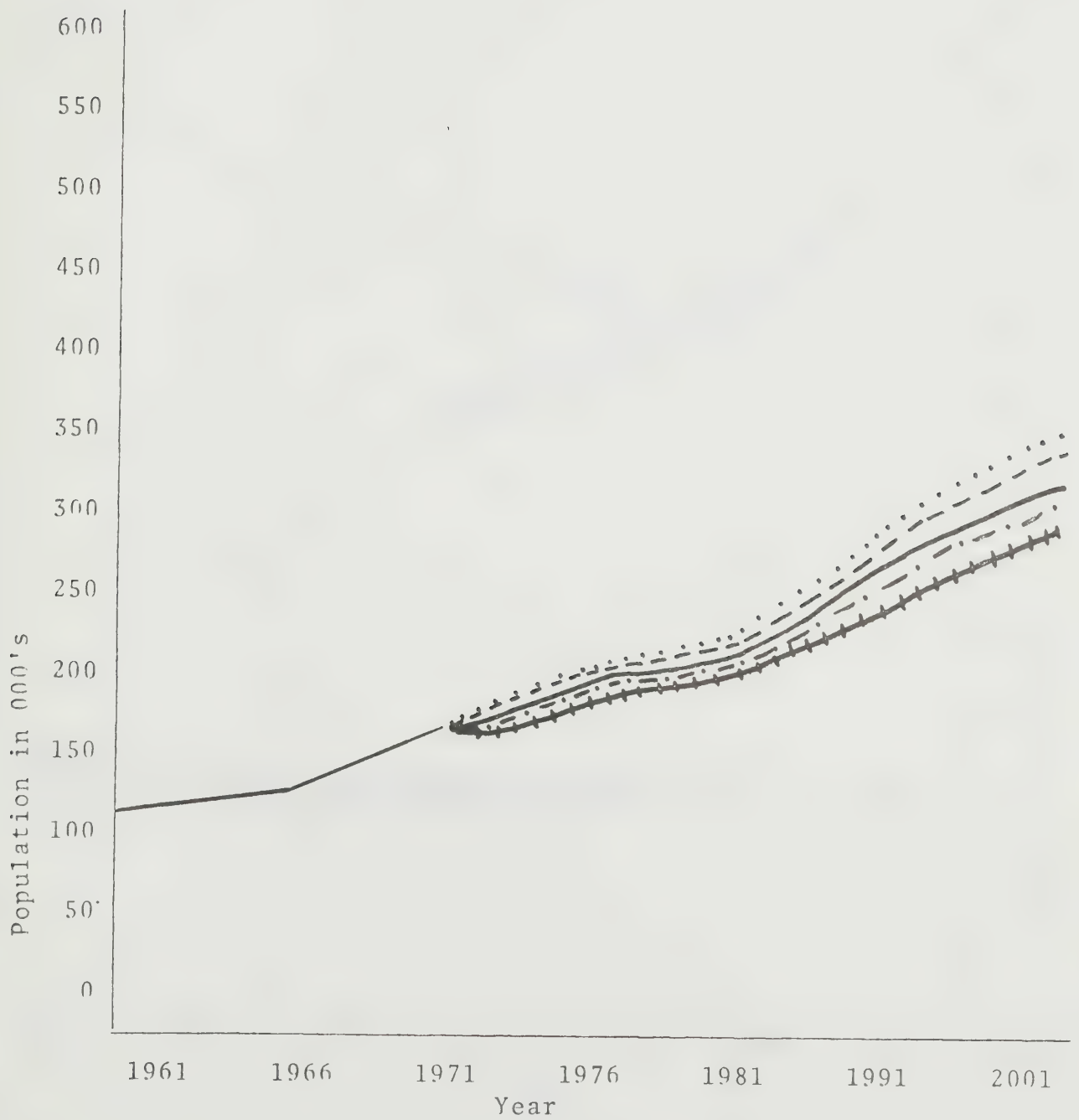
Saskatoon

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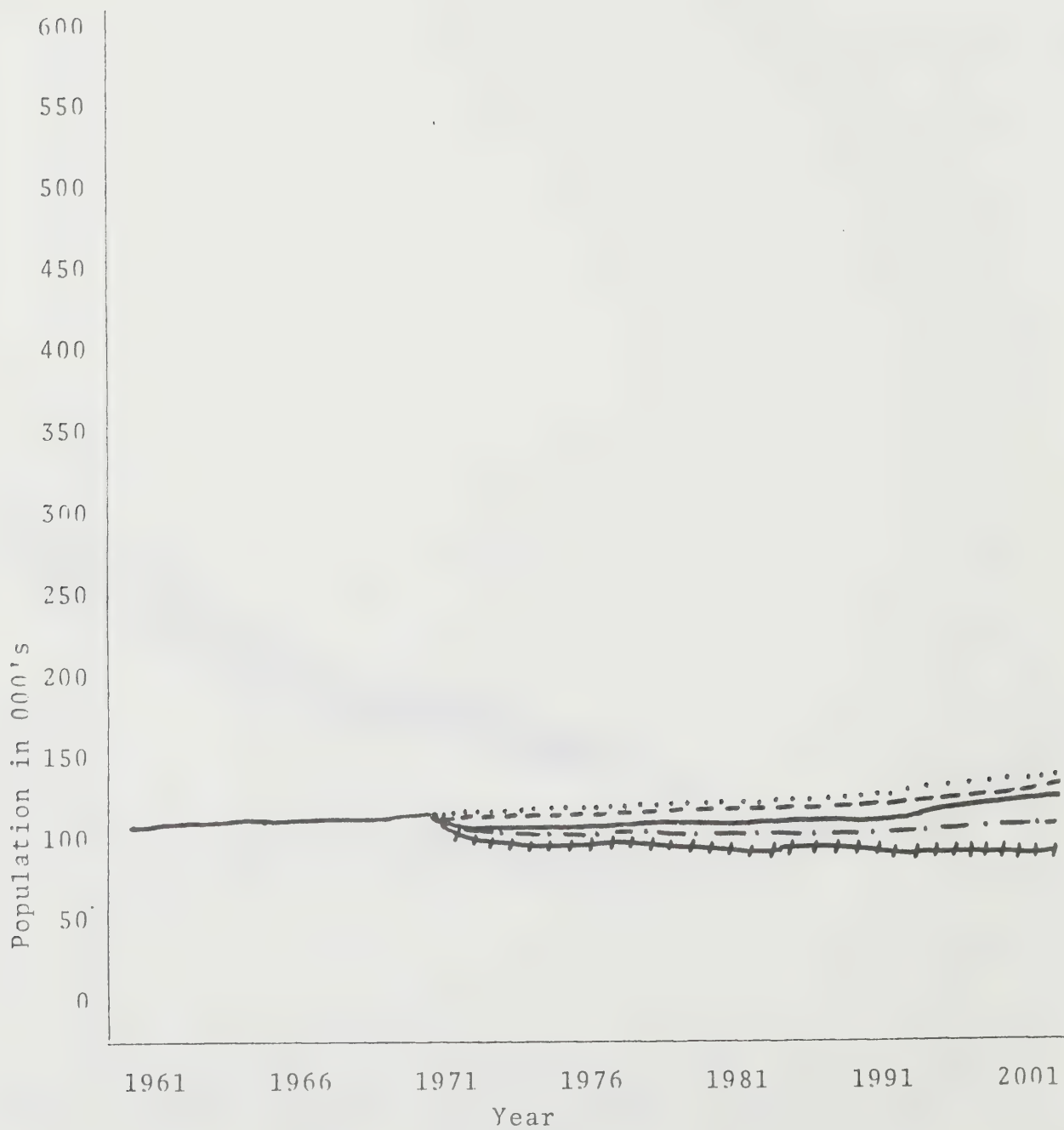
Sudbury

- Series no. 1
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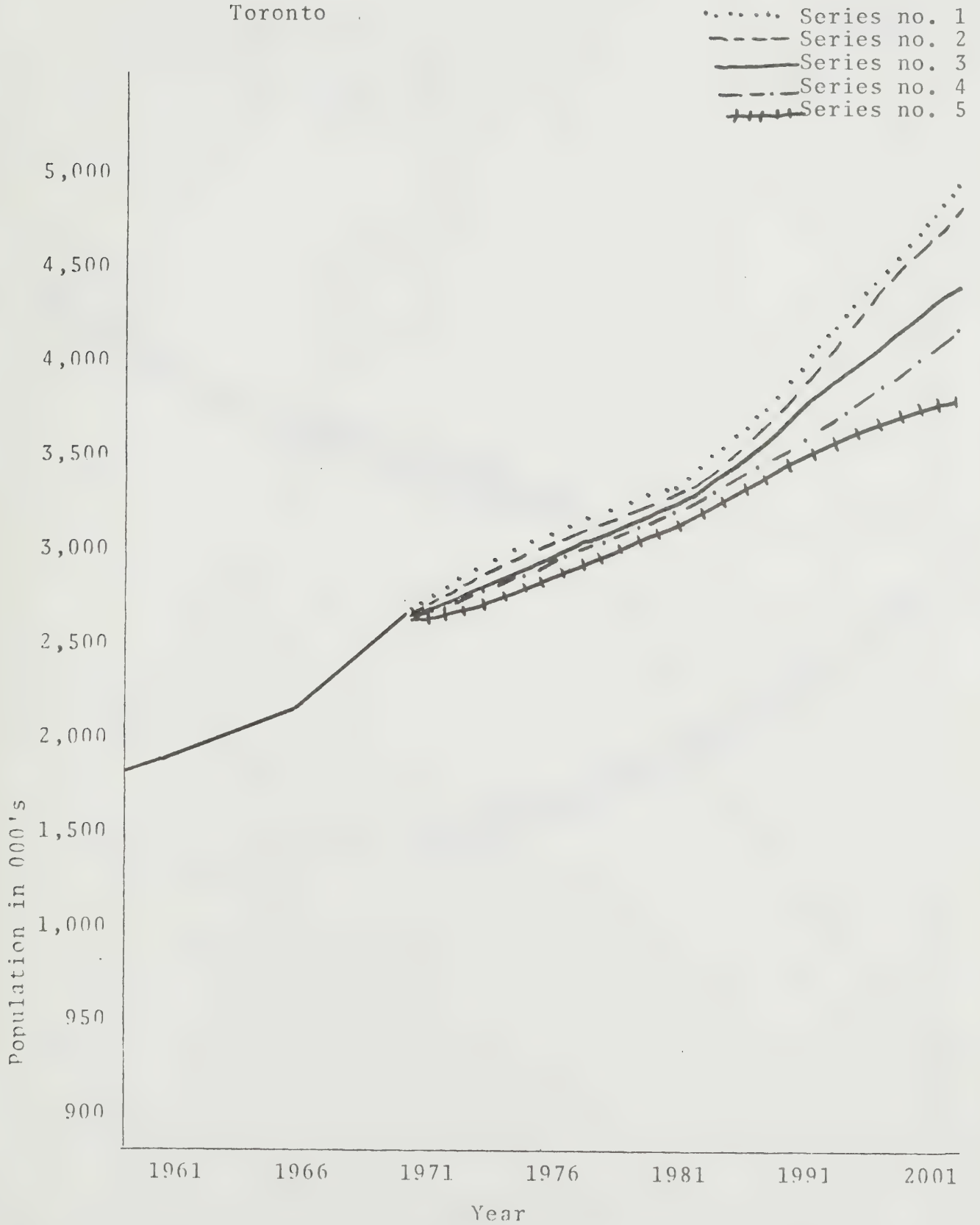


Thunder Bay

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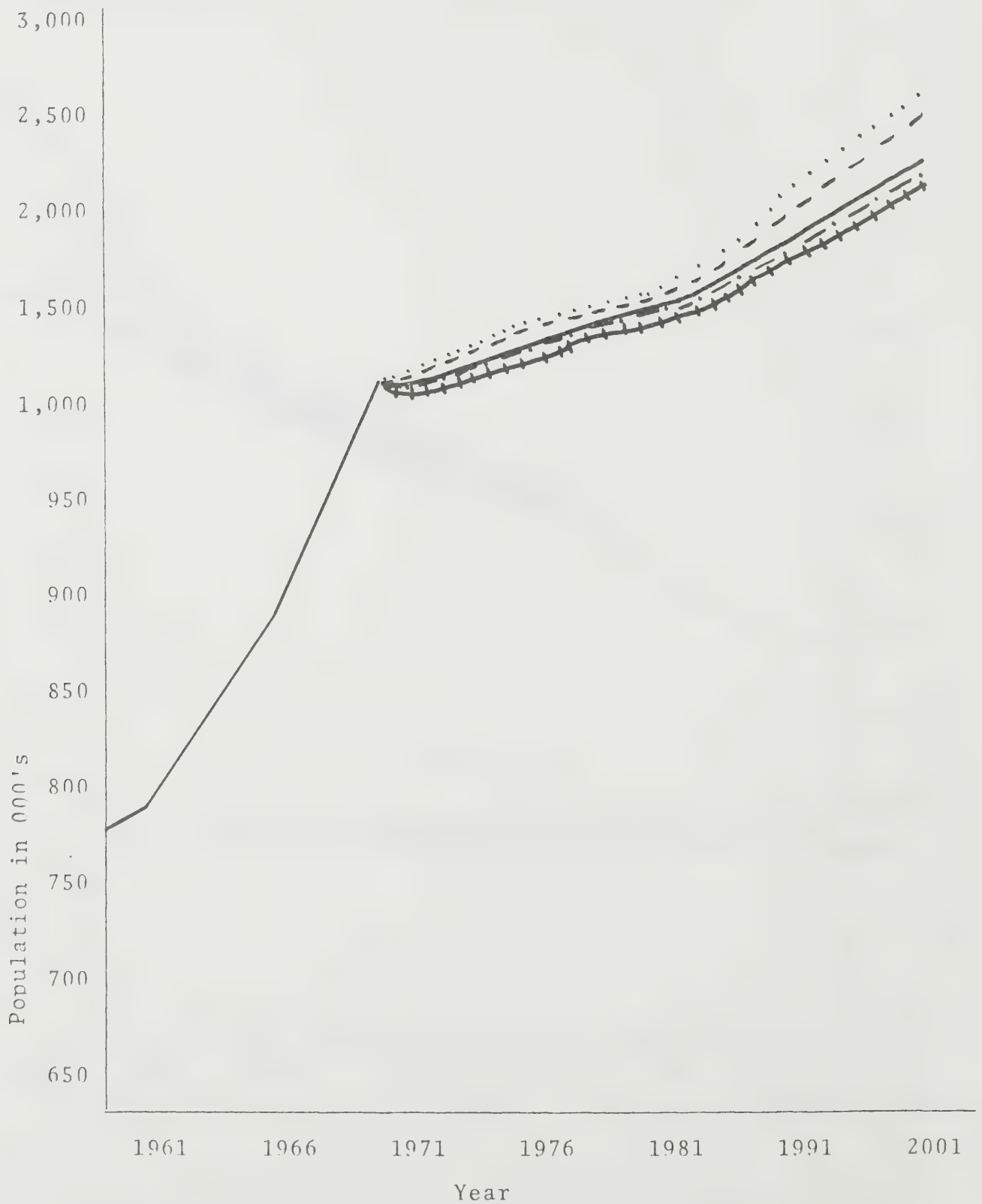


Toronto



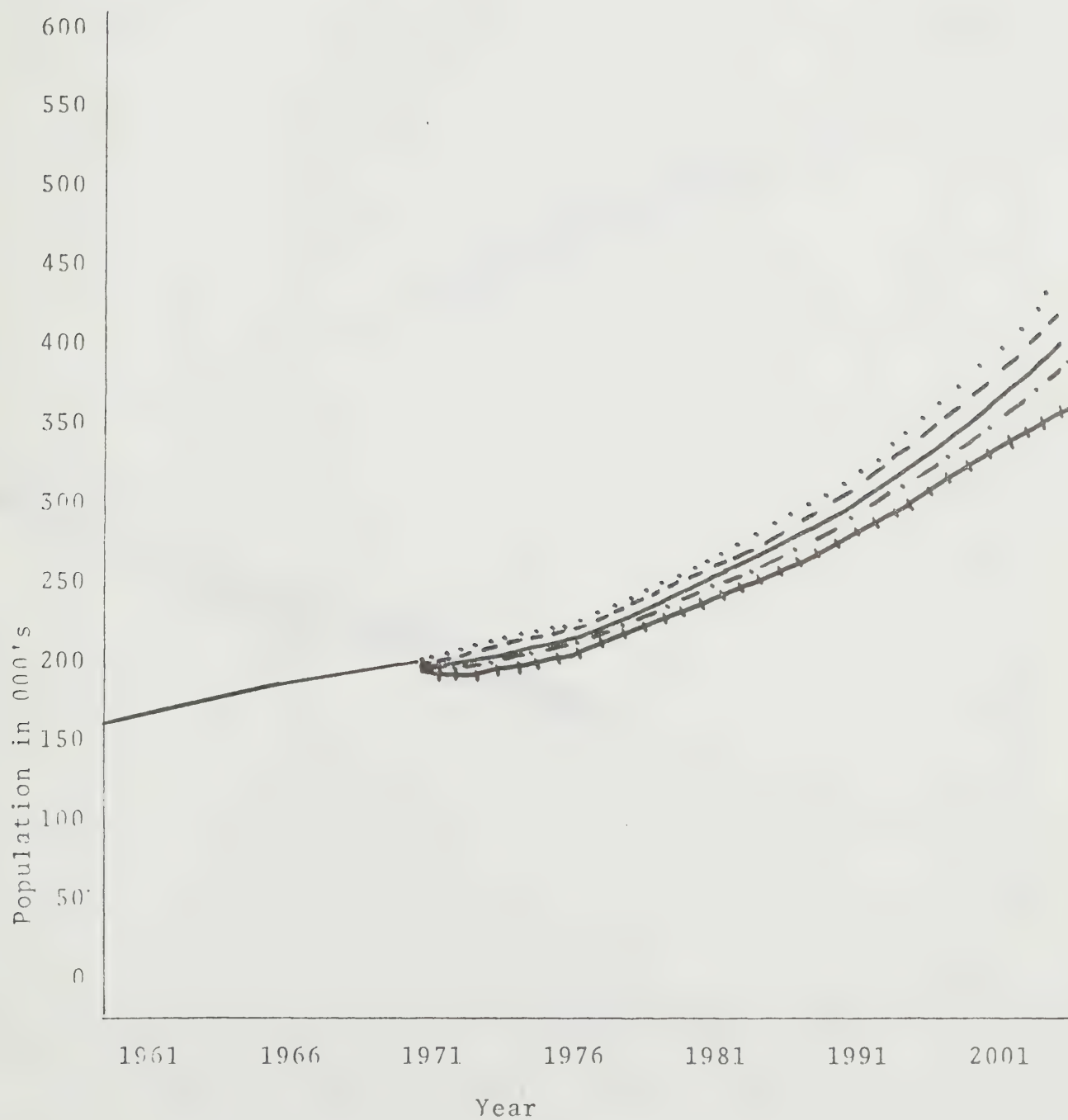
Vancouver

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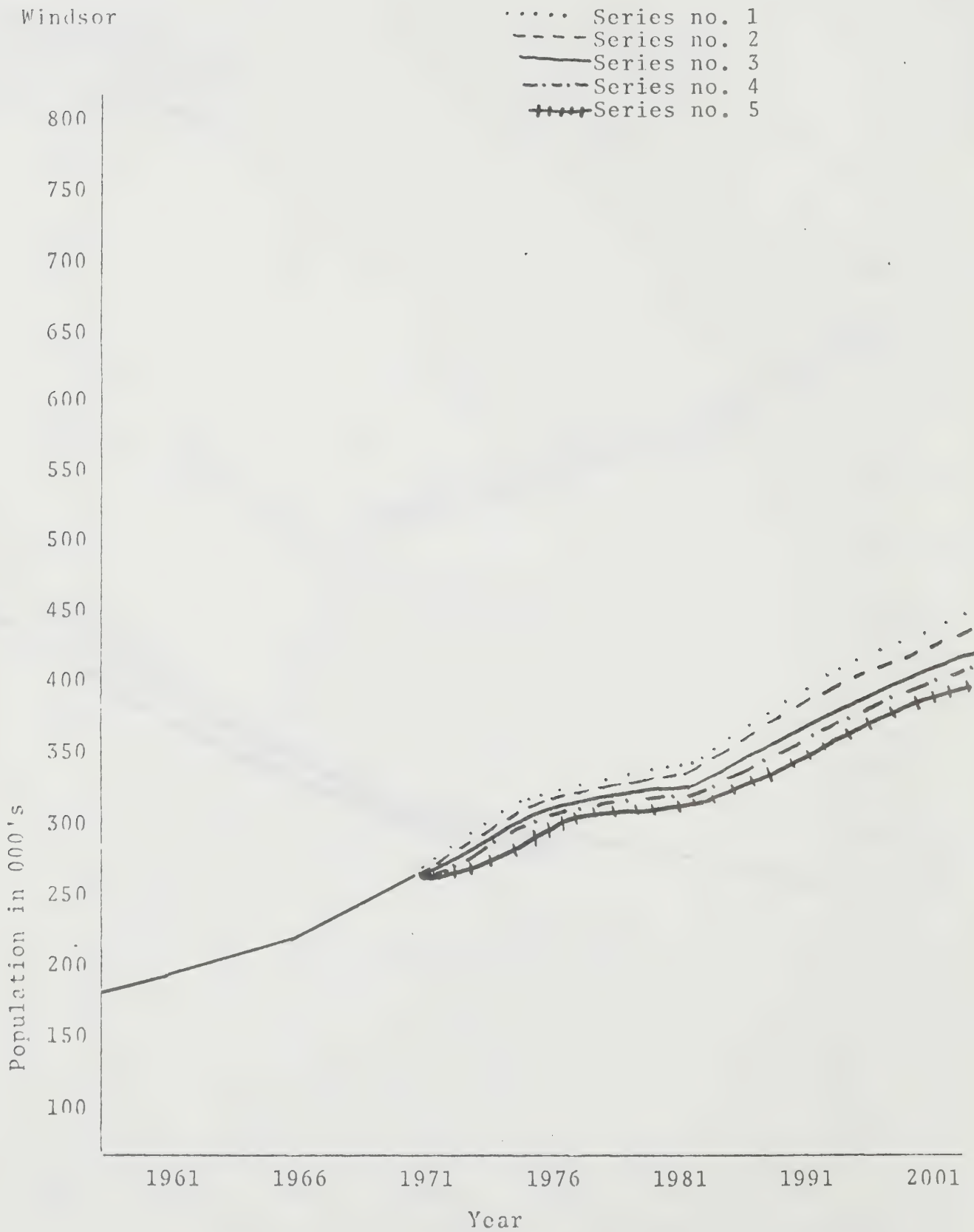


Victoria

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+ + + + +Series no. 5



Windsor



Winnipeg

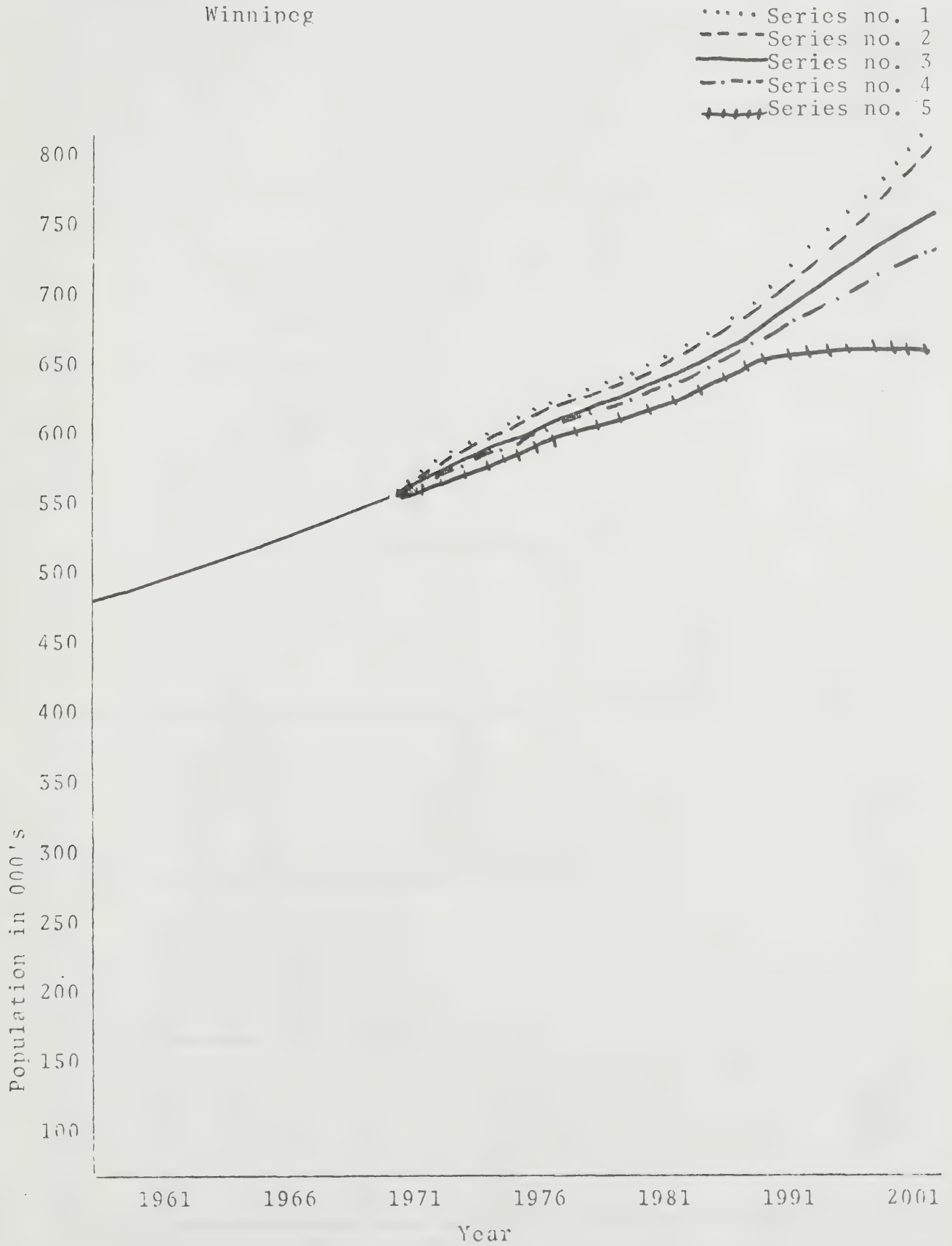
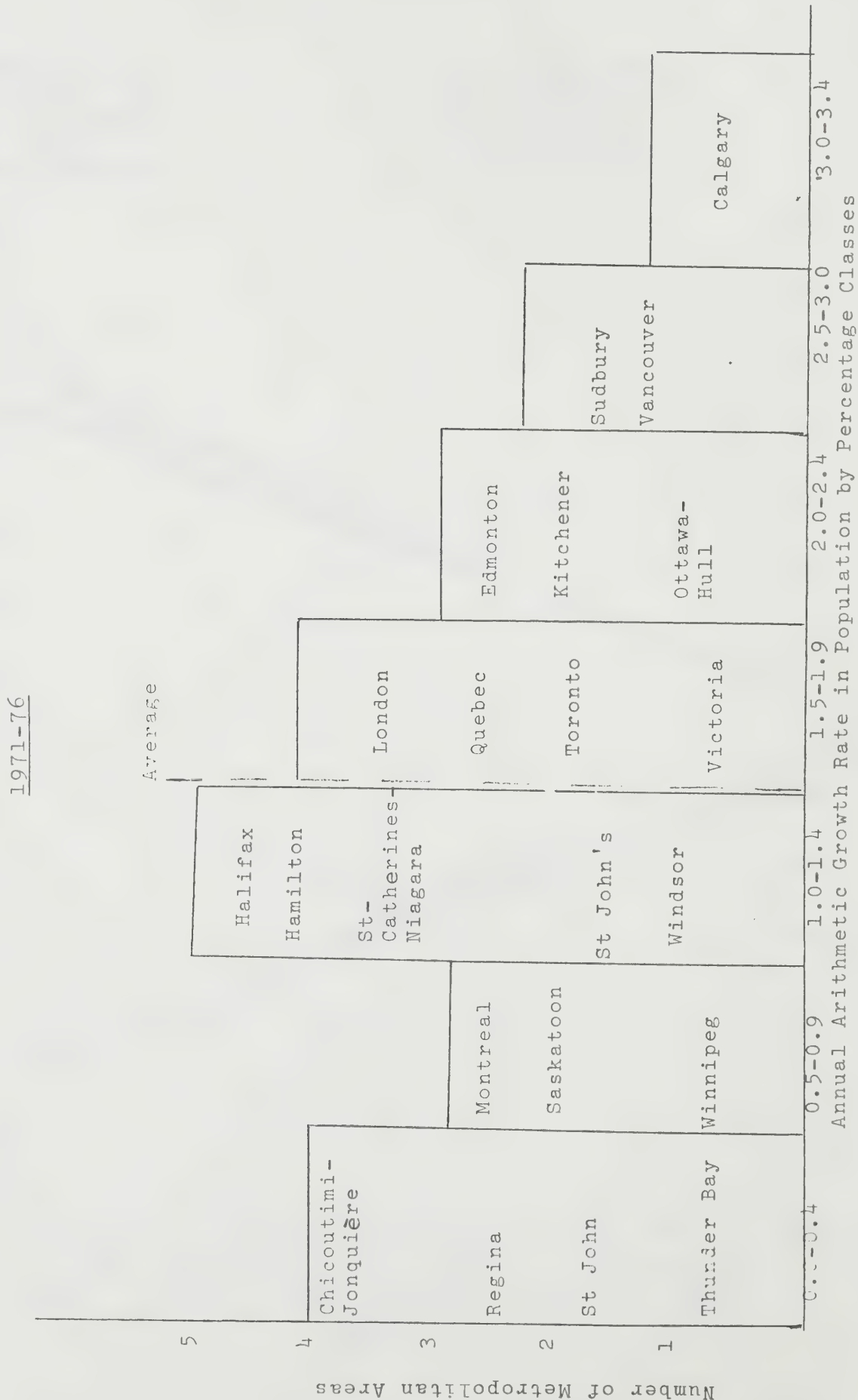
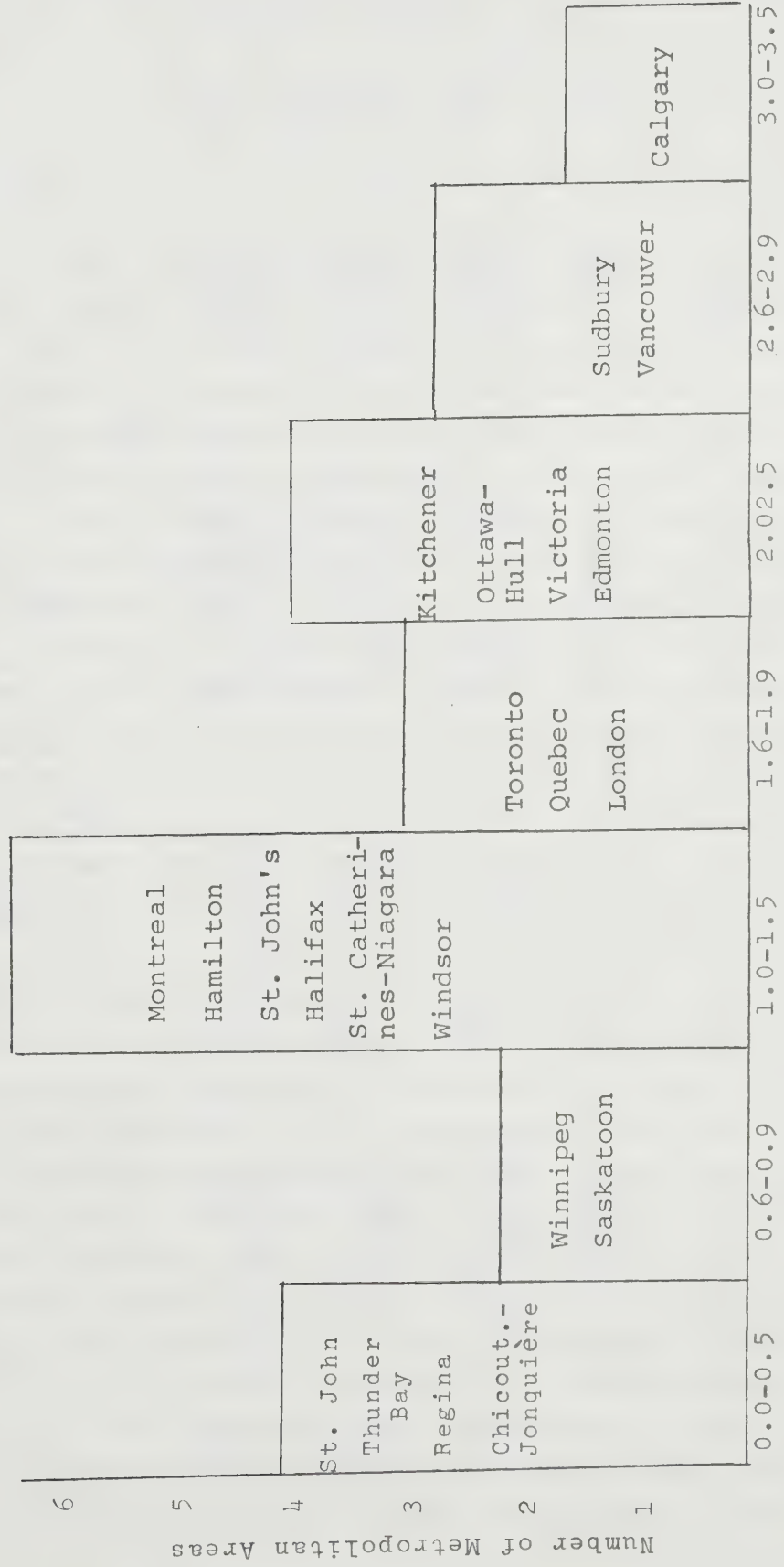


Figure 3 Number of metropolitan areas by annual arithmetic growth rate 1971-1976 and 1976-1981



1976-81



Annual Arithmetic Growth Rate in Population by Percentage Classes

largest of the 1971 Census CMA's. It would surpass Montreal some time between 1976 and 1981. Vancouver will double in population and have over 2,000,000 residents by 2001, according to the Series 3 assumptions (Table 5). Toronto would reach nearly 4,000,000 and Montreal would be somewhat over 3,500,000 in 2001, according to the Series 3 assumptions.

Table 6 shows large absolute average annual net increase of population for the three largest CMA's over the projection period. From 1971 to 1991 Toronto, for example, is projected in Series 3 as adding an average annual total of over 40,000 people to its population. The corresponding average annual addition for 1991-2001 drops to slightly below 39,000. Vancouver's average annual addition to population exceeds that of Montreal in each of the four five-year periods (Table 6), and exceeds even that of Toronto in 1991-2001, under the Series 3 assumptions. Vancouver's average annual net increase of population grows from 28,000 in 1971-76 to 44,000 in 1991-2001. The corresponding figures for Montreal increase from 23,000 in 1971-76 to 32,000 in 1981-91; but then they decline to 25,000 in 1991-2001. All these data are implications of the Series 3 assumptions.

Under the Series 3 assumptions, between the years of 1971 and 2001, the metropolitan areas of Vancouver and Toronto are expected to increase their share of the national population. It is projected that about 7.4 percent of the total Canadian population will reside in Vancouver by the year 2001 as compared to 5.0 percent in 1971. In the same period of time, Toronto is expected to increase its share of the national population by only 0.3 percent, that is, from a proportion of 12.8 percent in 1971 to a proportion of about 13 percent by the year 2001. On the other hand, the share of the total Canadian population living in Montreal is expected to decline by 0.8 percent

Table 5 Total projected population for each metropolitan area as per Series 3* (in 000's)

	1971**	1976	1981	1991	2001
Centres of 1,000,000+ population in 1971					
Montreal	2743	2858	2998	3319	3566
Toronto	2628	2846	3069	3515	3901
Vancouver	1082	1223	1385	1776	2220
Total	6453	6926	7452	8609	9688
Centres of 400,000-999,999 population in 1971					
Calgary	403	475	559	763	1010
Edmonton	495	558	627	783	952
Hamilton	498	526	556	619	675
Ottawa-Hull	602	667	741	912	1094
Quebec	480	522	570	680	793
Winnipeg	540	562	586	634	675
Total	3020	3313	3641	4393	5201
Centres of 100,000 to 399,999 popu- lation in 1971					
Halifax	222	235	249	278	303
Kitchener	226	252	279	338	402
London	286	313	343	410	481
St-Cat.-Nia.	303	321	340	379	417
Victoria	195	215	239	299	371
Windsor	258	278	298	339	382
Total	1493	1617	1750	2045	2359
Centres under 100,000 popula- tion in 1971					
Chic,-Jonquière	133	135	136	143	144
Regina	140	143	145	149	151
Saint John	106	107	108	108	108
St John's	131	139	146	160	174
Saskatoon	126	132	138	151	162
Sudbury	155	177	199	250	307
Thunder Bay	112	113	114	116	117
Total	906	948	990	1079	1165
Met. Total	11875	12805	13835	16127	18414

* Assumptions: see Table 1

** Actual - 1971 Census.

Table 6 Average annual projected population increase for each metropolitan area as per Series 3* (in 000's)

	1971-76	1976-81	1981-91	1991-2001
Centres of 1,000,000+ in 1971				
Montreal	22.9	28.1	32.0	24.8
Toronto	43.5	44.7	44.6	38.7
Vancouver	28.1	32.5	39.1	44.4
Total	94.5	105.3	115.7	107.9
Centres of 400,000-999,999 in 1971				
Calgary	14.5	16.7	20.4	24.7
Edmonton	12.5	13.8	15.6	16.9
Hamilton	5.6	6.0	6.3	5.6
Ottawa-Hull	13.0	14.8	17.1	18.2
Quebec	8.4	9.6	11.0	11.3
Winnipeg	4.5	4.7	4.8	4.2
Total	58.5	65.6	75.2	80.9
Centres of 200,000 to 399,999 in 1971				
Halifax	2.6	2.7	3.8	2.5
Kitchener	5.1	5.4	5.9	6.5
London	5.5	6.0	6.8	7.1
St-Cat.-Nia.	3.7	3.8	3.9	3.8
Victoria	4.0	4.8	6.0	7.2
Windsor	4.0	4.0	4.1	4.3
Total	24.9	26.7	29.5	31.4
Centres under 200,000 in 1971				
Chic.-Jonq.	0.3	0.3	0.6	0.2
Regina	0.6	0.5	0.4	0.2
Saint John	0.2	0.1	0.0	0.0
St John's	1.6	1.5	1.4	1.4
Saskatoon	1.1	1.2	1.3	1.2
Sudbury	4.3	4.6	5.0	5.7
Thunder Bay	0.3	0.2	0.2	0.1
Total	8.4	8.4	8.9	8.8
Total of 22 Met. Areas	186.3	206.0	229.3	229.0

* Assumptions: See Table 1

during the same period of time, from a proportion of 12.7 percent in 1971 to one of 11.9 percent by the year 2001. Again these data are merely implications of the Series 3 assumptions.

Table 5 also shows absolute population figures (Series 3) for the other CMA's grouped according to size in 1971. It is notable that Series 3 projects populations of over 1,000,000 for Calgary and Ottawa-Hull by the year 2001.

3 Concentration of the national and regional populations in CMA's

The projected changing concentration of national population in Census Metropolitan Areas may be broadly shown by finding one of the recent Statistics Canada projections that is based on assumptions that are roughly comparable to one of the present MSUA Series. Projection No. 11 of the Statistics Canada projections and MSUA Series 3 are roughly comparable in their underlying assumptions. According to these two sets of projections, the percentage of Canada's population residing in the 22 CMA's will increase only slightly, from 55 to 57 percent, over the 30 years from 1971 to 2001 (Table 7). Among the five major regions of Canada shown in Table 7, only the Prairies and Quebec show really marked increases in the proportion of the total population that resides in CMA's. In Ontario the corresponding percentage is projected as falling, while in British Columbia it falls from 1971 to 1981 but then rises again by 2001 to the 1971 level. In the Atlantic region, the percentage remains quite stable at somewhat above 20 percent. In short, according to the Series 3 and roughly comparable Statistics Canada assumptions, massive increases in the proportion of the national population residing within Census Metropolitan Areas are not envisaged up to the year 2001.

Table 8 shows the absolute and proportional distribution of the CMA population by major region, according to Series 3. Ontario had the largest proportion (41.3 percent) of the CMA population in 1971; but Series 3 projects a slight decline for Ontario through the year 2001 (to 40.8 percent). Quebec is projected as showing a significant decline in its proportion of the National CMA population through the year 2001.

A very slight decline (of less than 1/10 of 1 percent) is projected for the Atlantic region as well. Thus, the increasing shares of the national metropolitan area population are indicated for western

Table 7 Comparison of Series 3* projected metropolitan population with regional projected population as per Statistics Canada projection Series 11**, 1971-2001 (in 000's)

	1971	1981	1991	2001
Atlantic Region				
Region	2110.4	2286.8	2509.6	2664.3
C.M.A.'s	460.6	504.7	546.5	585.9
Percent (Metropolitan of Region)	21.8	22.1	21.8	22.0
Quebec Region				
Region	6027.8	6374.5	6796.7	6918.4
C.M.A.'s	3507.0	3861.7	4314.6	4675.5
Percent	58.18	60.58	63.48	67.58
Ontario Region				
Region	7703.1	9506.8	11662.3	13721.0
C.M.A.'s	4926.9	5776.3	6654.5	7513.6
Percent	63.96	60.76	57.06	54.76
Prairies Region				
Region	3542.4	3826.1	4182.4	4404.1
C.M.A.'s	1706.5	2057.3	2481.2	2952.4
Percent	48.2	53.8	59.3	67.0
British Columbia Region				
Region	2184.6	2878.5	3680.0	4468.3
C.M.A.'s	1278.2	1624.5	2075.2	2591.0
Percent	58.5	56.4	56.4	58.0
Canada				
Total Population	21568.3	24872.7	28831.0	32176.1
Metropolitan area	11874.2	13836.4	16126.9	18414.2
Percent	55.1	55.6	55.9	57.2

* Metropolitan - Projection Series 3, see Table 1

** Regional - Projection Series 11, Statistics Canada (see Statistics Canada, op.cit.)

Table 8 A Projected regional distribution by metropolitan area population as per Series 3
1971-2001 (in 000's)

	1971	1976	1981	1991	2001
Atlantic Region	460	483	504	546	585
Quebec Region	3506	3679	3888	4368	4775
Ontario Region	4919	5327	5755	6651	7505
Prairies Region	1706	1872	2057	2481	2952
British Columbia Region	1278	1438	1624	2075	2591
Metropolitan total	11874	12805	13835	16127	18414

Table 8 B

	Percentage Distribution*					
Atlantic	3.9	3.8	3.6	3.4	3.2	
Quebec	29.5	28.7	28.1	27.1	25.9	
Ontario	41.3	41.6	41.6	41.2	40.8	
Prairies	14.4	14.6	14.9	15.4	16.0	
British Columbia	10.8	11.2	11.7	12.9	14.1	
Canada total:	100.0	100.0	100.0	100.0	100.0	

* See Table 1

Canada - Prairies increasing their share by two percentage points, and British Columbia increasing its share by three percentage points. On the whole, however, the rank order of the major regions as regards proportional share of the national metropolitan area population is unchanged from 1971 to 2001.

4 Selected implications of metropolitan population growth

Much of the importance of population growth derives from its ramifications upon several aspects of the Canadian economy and society. In this section a few of the areas of ramification will be mentioned in connection with the projections.

4.1 Labour force

Growth of the labour force comprises an important area of implications of one set of population projections. Labour force growth is the immediate result of two components: the growth in the population of labour force age, and the labour force participation rate. The present projections cast light only on the former component.

A 1971-1981 growth rate in excess of 30 percent is projected under the Series 3 assumptions for the population of labour force age in Calgary, Sudbury, Vancouver and Victoria. The growth rate for Calgary is an impressive 45 percent, from 1971 to 1981, according to the Series 3 assumptions (see Table 9). At the opposite end of the range of growth rates of the population of labour force age, according to Series 3 assumptions, are Regina (5 percent), Saint John (6 percent), Winnipeg (9 percent) and Thunder Bay (9 percent).

4.2 Households

Another major area of immediate implications of the population projections pertains to the growth in the number of households. By setting forth assumptions concerning the proportion of the population, of a given age, that consists of household heads projections of households can be derived from population projections. In the following data the Series 3 projections will be used.

Table 9 Total projected population in the age group 15-64 for each metropolitan area as per Series 3* 1971-2001 (in 000's)

	1971	1981	1991	2001	Percentage increase 1971-1981
Centres of 1,000,000+					
in 1971					
Montreal	1800.4	2084.0	2189.3	2415.3	15.8
Toronto	1722.5	2053.8	2280.0	2603.7	19.2
Vancouver	698.6	922.4	1160.2	1498.1	32.0
Centres of 400,000-					
999,999 in 1971					
Calgary	254.8	369.6	491.2	668.5	45.1
Edmonton	313.7	414.7	504.1	630.3	32.2
Hamilton	316.3	372.8	401.9	450.9	17.9
Ottawa-Hull	387.3	496.2	591.8	730.1	28.1
Quebec	315.5	396.4	449.0	537.4	25.6
Winnipeg	345.9	376.0	388.8	434.0	8.7
Centres of 200,000-					
399,999 in 1971					
Halifax	143.1	161.0	172.2	197.0	12.5
Kitchener	144.5	186.9	219.6	268.7	29.3
London	182.0	230.0	266.6	321.5	26.4
St. Catharines-Niag.	190.0	228.1	246.4	278.7	20.1
Victoria	119.1	159.5	195.4	250.4	33.9
Windsor	159.0	199.7	220.2	255.3	25.6
Centres under 200,000					
in 1971					
Chicoutimi-Jonquières	84.7	95.7	94.4	98.0	13.0
Regina	87.7	92.0	83.2	85.3	4.9
Saint John	65.0	69.1	66.8	70.1	6.3
St. John's	80.1	89.6	94.3	108.2	11.9
Saskatoon	78.3	87.2	84.2	91.9	11.4
Sudbury	97.8	133.8	162.1	204.9	36.8
Thunder Bay	70.5	76.8	75.5	78.5	8.9

* Assumptions: See Table 1

In 1971 nearly 25 percent of all households were classified in the Census as family households. Among metropolitan areas, the proportion of a given age group that consists of family household heads had been fairly stable in the past fifteen or so years. (Table 10 shows the data for 1971 in respect to the three largest CMA's). These proportions are assumed to hold fairly constant from 1971 to 1981.

Statistics Canada defines non-family households as those households created by one adult living alone or formed by a group of persons living together but not in a family arrangement. In 1971, there were approximately 1.1 million non-family households in Canada. Two contrasting age groups are important in the consideration of these households. Firstly, young adults upon leaving their parents' home, for reasons other than wedlock, establish non-family households usually by renting an apartment or flat alone or with others. During the second half of the sixties, large numbers of new apartment buildings were built to accomodate this market. Secondly, the death of either husband or wife in an older couple usually results in a one-person household.

Table 11 displays the relative propensities for those two respective portions of the population (by selected age groups) to form non-family households. The first two columns of the table indicate that, in 1971, approximately 5 percent of single persons aged 15 to 24 formed non-family households. Similarly, for the single population aged 25 to 34, 30 percent had formed this type of household. This latter proportion, in part, accounts for the rapid increase in the total non-family households between the years of 1966 and 1971, especially since the 25 to 34 age group base population was very large.

The last two columns of the table relate to the ever-married, that is, those who, at the time of the

Table 10 Proportions of the 10 year age groups who head family households in three CMA's
1971

Age group	Proportion of age group who head family households (in %)		
	Montreal	Toronto	Vancouver
15-24	6	8	7
25-34	36	36	35
35-44	41	43	42
45-54	39	42	39
55-64	37	40	38
65+	26	27	28

Table 11 Propensities for selected age groups to form non family households (in percent) 1971

	Single persons		Ever married persons	
	Age 15-24	Age 25-34	Age 55-64	Age 65+
Level One centres				
Montreal	5	32	9	17
Toronto	5	30	9	20
Vancouver	7	38	11	24
Average	5.7	33.3	9.7	20.3
Level Two centres				
Calgary	9	41	11	22
Edmonton	8	36	10	21
Hamilton	4	24	7	22
Ottawa-Hull	5	32	8	18
Quebec	5	21	6	12
Winnipeg	7	28	10	22
Average	6.3	30.3	8.7	19.5
Level Three centres				
Halifax	5	25	8	16
Kitchener	5	27	8	20
London	6	33	10	23
Victoria	7	34	11	25
Windsor	3	21	10	23
Average	5.2	28.0	9.4	21.4
Level Four centres				
Regina	9	32	11	23
Saint John	2	11	8	19
St John's	2	12	5	11
Saskatoon	10	40	11	23
Sudbury	3	19	7	17
Average	5.2	22.8	8.4	18.6

Source: 1971 Census, Statistics Canada.

1971 Census, were either widowed, divorced or separated and headed non-family households. The ever-married, for the selected age groups of 55 to 64 and the 65 and over, form our second population group. Of the total population in 1971 who were aged 55 to 64, approximately 9 percent formed non-family households. For the 65 and over age group, the average proportion was 20 percent. The latter has increased by almost 7 percentage points since 1956 and by 1986 is projected to be 26 percent, on the average.

Computation of projected age-specific household formation propensities permit the estimation of future numbers of households. Table 12 illustrates the projected increases in total households over the 1971-1981 period. During this decade, some 820 thousand households will be added to the three largest metropolitan centres of Canada. Toronto and Montreal will absorb 40 and 35 percent of these new households respectively with Vancouver accounting for the remaining one-quarter. In total, the three largest Census Metropolitan Areas will account for 38 percent of the projected national growth of total households (2.2 million) during this period. Under Series 3 these three CMA's are projected to account for an aggregate proportion of the national population growth by 30 percent during the same period.

The metropolitan areas with the most rapid population growth are, as expected, those with the most pronounced increases in households between 1971 and 1981. Table 12 shows a projected 66 percent increase in the number of households for Calgary CMA between 1971 and 1981. Percentage increases above 50 percent are also projected for Vancouver (59 percent), Edmonton (57 percent), Ottawa-Hull (53 percent), Quebec (55 percent), Kitchener-Waterloo (50 percent) and Sudbury (56 percent). Percentage increases above 30 percent, in the number of households from 1971

Table 12 Increase in total households for each metropolitan area, Series 3 1971-1981

	(1) 1971 Households (000's)	(2) 1981 Households (000's)	(3) 1971-81 Change (000's) (2-1)	(4) 1971-81 Percentage Change (3/1)X100
Level One centre				
Montreal	808.0	1090	282.0	34.9
Toronto	775.9	1112	336.1	43.3
Vancouver	347.1	550	202.9	58.5
Total	1931.0	2752	821.0	42.5
Level Two centre				
Calgary	121.4	202	80.6	66.4
Edmonton	144.1	226	81.9	56.8
Hamilton	146.5	195	48.5	33.1
Ottawa-Hull	171.7	263	91.3	53.2
Quebec	128.2	199	70.8	55.2
Winnipeg	167.2	220	52.8	31.6
Total	879.1	1305	425.9	48.4
Level Three centre				
Halifax	60.4	82	21.6	35.8
Kitchener	66.6	100	33.4	50.2
London	87.4	127	39.6	45.3
St-Catharines-Niagara			23.0	
Victoria	66.7	98	31.3	46.9
Windsor	74.6	100	25.4	34.0
Total				
Level Four centre				
Chicoutimi-Jonquière			5.0	
Regina	42.8	53	10.2	23.8
Saint John	28.9	34	5.1	17.6
St John's	30.0	42	12.0	40.0
Saskatoon	38.6	48	9.4	24.4
Sudbury	39.8	62	22.2	55.8
Thunder Bay			4.0	
Total				

to 1981, are projected for all CMA's except Chicoutimi-Jonquière, Regina, Saint John, Saskatoon and Thunder Bay.

Figure 4 shows a breakdown by age group, of the household head, of the projected 1971-81 percentage increase in households. The most rapid increase occurs in the age group 25 to 34, followed by that in the households headed by persons aged 15 to 24.

4.3 Land requirements

It is possible to derive the land requirements that may be associated with a specific population projection for metropolitan areas. However, very stringent assumptions are needed to make this derivation; because in fact the future land requirements of the total stock of households will depend on several factors whose consideration would take one far beyond the desirable scope of this report. Such factors include personal income growth and the taste for single-family detached housing units, among other variables. For the purposes of illustration only, however, a series of pertinent calculations is shown below.

Assume as a working hypothesis that dwelling units will be constructed at three density levels in the metropolitan areas between 1971 and 1981. These three are:

- (a) Low density - single and semi-detached as well as duplexes built at 5 units per gross acre.
- (b) Medium density - row and garden houses up to three storeys built at 20 units per gross acre.
- (c) High density - apartment buildings of 4 storeys and more at 50 units per gross acre.

Secondly, let the following percentage distributions represent the relationship between household growth by age group and their corresponding density levels (Table 13). That is, 100 percent of total household

Figure 4 Projected percentage increase in households
by age group, Series 3 1971-1981

Average for the three largest CMA's

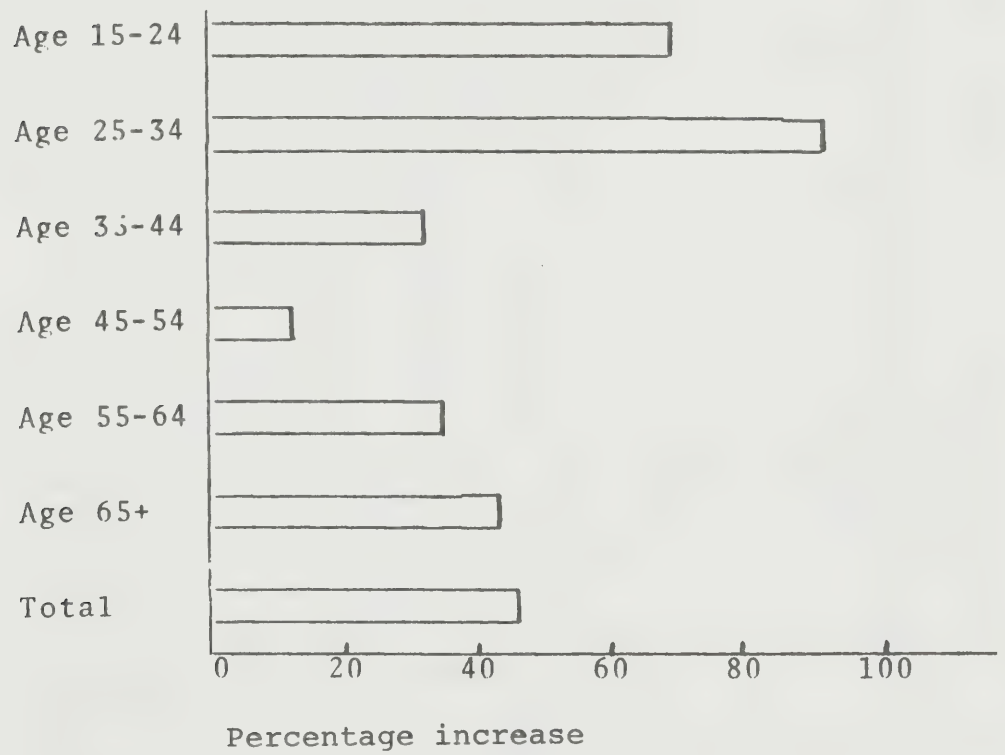


Table 13 Projected density by age group (percent)

Age of household head	Low	Medium	High	Total
15-24	0	0	100	100
25-34	50	25	25	100
35-54	75	25	0	100
55	0	75	25	100

growth in the 15 to 24 age group will occupy high density dwellings. However, for the 25 to 34 age group, 50 percent will occupy units of low density while 25 percent will occupy medium density and the remaining 25 percent will occupy high density.

Thus if the projected household growth by age group is factored by the above percentage distribution, estimates of land requirements can be made. Table 14 shows the acreage totals for each of the metropolitan areas in the larger CMA's.

Through this procedure it is estimated that the three largest Census Metropolitan Areas will need in total 82,000 acres of land for new residential development between 1971 and 1981. Of this total, approximately three-quarters will be for low density development. In the case of the six next largest Metropolitan Areas as of 1971, total residential land requirements are projected to be 45,000 acres.

These figures were derived mainly from the basic assumption that new households in the 25 to 54 age group would acquire low density dwelling units over the seventies, that is, a continuation of suburban development similar to the 1950's and 1960's. However, several factors may in fact mitigate against this type of urban growth.

High land costs coupled with increased transport costs may lower demand for low density suburban developments. Historically, a sector of the population was always willing to accept higher transit costs both in dollars and time in order to acquire low density housing. Will they continue to do so? In this context transport implications of population growth are important. Two points arise here. One is the expected total growth in automobiles and the other is the resultant flow pattern mainly in journey to work. Residential location has relatively little impact on the first but is very important in the latter.

Table 14 Residential land requirements by metropolitan area for selected CMA's (Series 3)
1971-1981 (000's of acres)

	Low density	Medium density	High density	Total
Level One centres				
Montreal	20.0	5.4	1.6	27.0
Toronto	27.4	5.7	1.9	35.0
Vancouver	15.2	3.6	1.2	20.0
Total	62.6	14.7	4.7	82.0
Level Two centres				
Calgary	6.8	1.4	0.48	8.7
Edmonton	6.4	1.5	0.56	8.5
Hamilton	3.4	1.2	0.34	4.9
Ottawa-Hull	7.8	1.7	0.52	10.0
Quebec	5.6	1.2	0.36	7.2
Winnipeg	3.6	1.2	0.34	5.1
Total	33.6	8.2	2.60	44.4

4.4 Transportation and environment

Two additional areas in which implications of the population projections may be sought are urban transportation and environmental quality. There are several quite clearly discernible relationships between the size of a Canadian city and the magnitude of investment in private automobile transport and public transit and its consequences on urban congestion. In this respect, according to the analysis⁴, for those smaller and medium-sized metropolitan areas that grow rapidly, they are subject to increasing "turbulence" in the sense that automobile ownership increases substantially, and this is accompanied by higher levels of truck activity. Not only must these new levels of street traffic congestion be adapted to, quickly, but the pressure to expand transit service will be relatively greater than those generated by population size increases alone; these cities will, in other words, take on characteristics and problems with which they are unfamiliar.

Lastly, attention should be drawn to the selected impacts of population growth over the environment. Concern is being expressed about the following aspects: detrimental effects of out-migration on the central city, uncontrolled urban sprawl and pollution (air, noise, etc.). Furthermore, suburbanization creates severe problems in relation to the development of the inner-city particularly in terms of costs or financing of services.

Population projection by metropolitan area as per given assumptions 1 to 5* 1976

C.M.A.	1	2	3	4	5
Calgary	489,643	489,643	475,643	475,643	468,643
Chicoutimi-Jonquière	135,865	135,865	135,115	135,115	134,740
Edmonton	570,967	570,967	558,367	558,367	552,067
Halifax	239,008	239,008	235,858	235,858	234,283
Hamilton	541,975	541,975	526,725	526,725	519,100
Kitchener	256,206	256,206	252,356	252,356	250,431
London	321,988	321,988	313,538	313,538	309,313
Montreal	2,929,558	2,929,558	2,857,508	2,857,508	2,821,483
Ottawa-Hull	680,440	680,440	667,640	667,640	661,240
Quebec	524,619	524,619	522,269	522,269	521,094
Regina	146,015	146,015	143,565	143,565	142,340
St-Catharines-Niagara	326,152	326,152	321,702	321,702	319,477
St John's	140,900	140,900	139,500	139,500	138,800
Saint John	108,429	108,429	107,679	107,679	107,300
Saskatoon	134,723	134,723	132,223	132,223	130,973
Sudbury	179,152	179,152	177,002	177,047	175,972
Thunder Bay	115,382	115,382	113,582	113,582	112,682
Toronto	2,992,721	2,992,721	2,845,571	2,845,571	2,771,996
Vancouver	1,261,454	1,261,454	1,222,754	1,222,754	1,203,404
Victoria	219,564	219,564	215,614	215,614	213,639
Windsor	285,632	285,632	278,482	278,482	274,907
Winnipeg	579,205	579,205	562,755	562,755	554,530
22 C.M.A.'s	13,179,598	13,179,598	12,805,448	12,805,493	12,618,414

* Assumptions: See Table 1

Population projection by metropolitan area as per given assumptions 1 to 5* 1981

C.M.A.	1	2	3	4	5
Calgary	591,245	589,357	559,307	555,638	538,861
Chicoutimi-Jonquière	139,781	139,223	137,712	136,603	135,297
Edmonton	656,194	658,992	627,516	623,212	607,895
Halifax	256,956	256,044	249,603	247,803	243,702
Hamilton	589,781	587,797	556,865	553,008	535,698
Kitchener	288,330	287,385	279,332	277,469	272,533
London	362,256	361,052	343,570	341,227	331,363
Montreal	3,155,431	3,144,000	2,998,170	2,975,868	2,892,224
Ottawa-Hull	770,813	768,185	741,416	736,258	720,368
Quebec	577,179	575,083	570,178	566,006	561,480
Regina	151,359	150,818	145,919	144,858	141,890
St-Catharines-Niagara	350,904	349,737	340,637	338,333	332,656
St-John's	150,267	149,745	146,885	145,849	143,909
Saint John	109,933	109,555	108,058	107,308	106,185
Saskatoon	143,964	143,454	138,385	137,382	134,361
Sudbury	205,164	204,499	199,946	198,708	195,788
Thunder Bay	118,786	118,378	114,787	113,984	111,796
Toronto	3,378,366	3,367,094	3,068,856	3,047,419	2,888,415
Vancouver	1,471,100	1,466,513	1,385,195	1,376,300	1,331,407
Victoria	248,360	247,618	239,355	237,896	233,055
Windsor	314,073	313,057	298,429	296,445	288,178
Winnipeg	621,458	619,345	586,240	582,131	563,615
22 C.M.A.'s	14,651,700	14,601,931	13,836,361	13,739,705	13,310,676

* Assumptions: See Table 1

Population projection by metropolitan area as per given assumptions 1 to 5* 1986

C.M.A.	1	2	3	4	5
Calgary	710,416	703,751	655,295	642,533	612,358
Chicoutimi-Jonquière	144,934	143,233	140,946	137,579	134,774
Edmonton	752,032	744,606	702,881	688,536	660,884
Halifax	276,667	273,758	263,879	258,180	250,487
Hamilton	642,224	635,888	588,781	576,673	547,491
Kitchener	323,673	320,530	307,914	301,775	292,509
London	407,692	403,703	376,524	368,873	351,705
Montreal	3,423,258	3,387,237	3,164,458	3,095,527	2,951,802
Ottawa-Hull	875,693	866,901	824,784	807,706	778,498
Quebec	639,144	632,334	624,631	611,106	600,563
Regina	156,851	155,189	147,858	144,628	139,415
St-Catharines-Niagara	377,903	374,167	360,212	352,903	342,395
St-John's	159,730	158,046	153,681	150,370	146,573
Saint John	111,342	110,178	107,943	105,646	103,394
Saskatoon	154,138	152,524	144,811	141,677	136,326
Sudbury	233,480	231,201	223,999	219,622	213,848
Thunder Bay	122,231	120,978	115,618	113,179	109,326
Toronto	3,786,589	3,750,197	3,296,944	3,229,673	2,973,572
Vancouver	1,717,232	1,701,513	1,572,758	1,542,787	1,464,541
Victoria	283,291	280,750	267,695	262,755	253,863
Windsor	344,227	340,905	318,493	312,108	297,911
Winnipeg	667,244	660,590	610,588	597,881	566,981
22 C.M.A.'s	16,309,991	16,148,179	14,970,993	14,661,717	13,929,216

* Assumptions: See Table 1

Population projection by metropolitan area as per given assumptions 1 to 5* 1991

C.M.A.	1	2	3	4	5
Calgary	845,047	832,388	763,003	738,989	693,301
Chicoutimi-Jonquière	149,037	146,264	143,203	137,728	133,509
Edmonton	854,993	841,505	783,163	757,318	716,088
Halifax	296,403	291,394	277,957	268,207	256,818
Hamilton	694,104	683,190	619,589	598,989	557,817
Kitchener	361,530	355,859	338,306	327,295	313,265
London	455,577	448,441	410,938	397,389	372,414
Montreal	3,680,176	3,618,924	3,318,643	3,202,170	2,998,395
Ottawa-Hull	986,909	971,077	912,342	881,808	838,048
Quebec	703,459	691,455	680,739	656,931	639,823
Regina	162,017	159,264	149,522	144,211	136,834
St-Catharines-Niagara	405,137	398,667	379,681	367,102	351,592
St-John's	169,555	166,646	160,720	155,021	149,301
Saint John	112,867	110,932	107,962	104,150	100,798
Saskatoon	164,422	161,662	151,240	145,928	138,222
Sudbury	264,264	260,081	249,964	241,917	232,918
Thunder Bay	125,573	123,485	116,374	112,343	106,873
Toronto	4,188,020	4,124,917	3,514,796	3,400,395	3,047,123
Vancouver	1,986,080	1,956,944	1,776,017	1,721,069	1,605,689
Victoria	322,231	317,512	299,166	290,056	276,571
Windsor	375,792	369,930	339,400	328,253	307,863
Winnipeg	712,541	701,184	634,150	612,736	569,503
22 C.M.A.'s	18,015,734	17,731,721	16,126,875	15,590,005	14,452,765

* Assumptions: See Table 1

Population projection by metropolitan area as per given assumptions 1 to 5* 1996

C.M.A.	1	2	3	4	5
Calgary	994,340	974,404	881,515	843,981	780,599
Chicoutimi-Jonquière	152,061	148,287	144,464	137,028	131,481
Edmonton	963,377	943,023	866,790	828,056	772,097
Halifax	315,657	308,475	291,390	277,480	262,334
Hamilton	744,578	728,916	648,647	619,396	566,221
Kitchener	401,553	393,024	370,167	353,686	334,461
London	505,213	494,588	446,190	426,190	392,961
Montreal	3,917,120	3,830,682	3,452,737	3,289,899	3,027,226
Ottawa-Hull	1,102,769	1,079,055	1,002,539	957,084	897,625
Quebec	769,075	751,423	737,500	702,532	678,349
Regina	166,609	162,803	150,694	143,411	133,962
St-Catharines-Niagara	432,472	423,099	398,923	380,794	360,115
St-John's	179,405	175,224	167,693	159,531	151,848
Saint John	114,470	111,772	108,069	102,775	98,351
Saskatoon	174,408	170,481	157,313	149,816	139,755
Sudbury	297,412	291,014	277,711	265,434	252,810
Thunder Bay	128,830	125,917	117,072	111,483	104,442
Toronto	4,575,918	4,484,884	3,717,899	3,555,596	3,106,133
Vancouver	2,274,758	2,229,886	1,992,181	1,908,326	1,752,118
Victoria	365,059	357,764	333,598	319,586	300,941
Windsor	408,495	399,870	360,900	344,653	317,824
Winnipeg	756,442	740,265	656,190	626,035	570,607
22 C.M.A.'s	19,740,021	19,324,856	17,280,182	16,502,772	15,132,260

* Assumptions: See Table 1

Population projection by metropolitan area as per given assumptions 1 to 5* 2001

C.M.A.	1	2	3	4	5
Calgary	1,158,189	1,129,094	1,010,128	955,948	872,452
Chicoutimi-Jonquière	154,106	149,320	144,759	135,391	128,570
Edmonton	1,076,126	1,047,666	952,411	898,816	826,902
Halifax	333,830	324,299	303,536	285,243	266,290
Hamilton	793,428	772,505	675,545	637,043	571,821
Kitchener	443,028	431,159	402,683	379,939	355,083
London	556,128	541,450	481,669	454,380	412,422
Montreal	4,134,240	4,020,740	3,566,210	3,355,269	3,034,639
Ottawa-Hull	1,222,430	1,189,449	1,094,120	1,031,518	955,089
Quebec	834,835	810,749	793,464	746,008	714,143
Regina	170,486	165,605	151,202	141,970	130,542
St-Catharines-Niagara	459,846	447,204	417,709	393,482	367,411
St-John's	188,898	183,347	174,188	163,436	153,751
Saint John	115,932	112,452	108,026	101,247	95,773
Saskatoon	183,908	178,732	162,812	153,037	140,622
Sudbury	332,817	323,746	306,993	289,702	273,007
Thunder Bay	131,909	128,126	117,579	110,400	101,825
Toronto	4,945,563	4,823,532	3,901,814	3,688,633	3,144,655
Vancouver	2,583,100	2,518,894	2,219,932	2,101,466	1,900,344
Victoria	412,156	401,652	371,105	351,122	326,620
Windsor	441,857	430,088	382,416	360,530	327,013
Winnipeg	798,185	776,802	675,865	636,612	569,166
22 C.M.A.'s	21,470,997	20,906,611	18,414,166	17,371,192	15,668,140

* Assumptions: See Table 1

Notes

- 1 For more details see "Méthodes et hypothèses des projections démographiques des 22 Régions Métropolitaines de Recensement du Canada", Demographic Research Group, MSUA, 1975.
- 2 Statistics Canada, Population Projections for Canada and the Provinces, 1972-2001. Cat. 91-514 Hors Série, Information Canada, Ottawa, Juin 1974.
- 3 For further discussion of the migration assumptions see "Méthodes et hypothèses des projections démographiques des 22 Régions Métropolitaines de Recensement du Canada", Demographic Research Group, MSUA, 1975.
- 4 A deeper analysis of urban transport impact was presented in the original document of this report.

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